

A  
T R E A T I S E  
O N T H E  
D I S E A S E S O F T H E E Y E,  
A N D T H E I R  
R E M E D I E S;  
T O W H I C H I S P R E F I X E D,  
T H E  
A N A T O M Y O F T H E E Y E;  
T H E  
T H E O R Y O F V I S I O N;

And the several Species of IMPERFECT SIGHT.

Illustrated with COPPER PLATES.

---

By GEO. CHANDLER, SURGEON.

---

L O N D O N:

Printed for T, CADELL in the STRAND.

M.DCC.LXXX.

THE ANATOMY OF THE HUMAN BODY

DISSECTED BY THE LATE

J. H. M. D. E. S.

TO WHICH IS PREFIXED

ANATOMY OF THE HUMAN BODY

THEORY OF THE HUMAN BODY



BY GEO. CHANDLER, ESQ.

LONDON

Printed by T. Caddell, in the Strand.

M. D. CC. LXX.



# C O N T E N T S.

	Page
CHAP. III.	
Ectropium. An eversion of the eyelid	84
CHAP. IV.	
Trichiasis	88
CHAP. V.	
Ancyloblepharum	93
CHAP. VI.	
Of the various tubercles, or excrescences ob- served on the eyelids	98
CHAP. VII.	
A pustulous excoriation and ulceration of the eyelids	102
CHAP. VIII.	
Lippitudo. An immoderate discharge from the ciliary glands	105
CHAP. IX.	
Epiphora. Watery eye.	106
CHAP. X.	
Cancer of the eyelids	107
CHAP. XI.	
Encanthis	109
CHAP. XII.	
Unguis, Pterygium, or Pannus. Nail or web of the eye	111
CHAP. XIII.	
Fistula lachrymalis	116
CHAP. XIV.	
Ophthalmy	127
	CHAP.

# C O N T E N T S.

## CHAP. XV.

Phlyctenæ, or vesications of the cornea and conjunctive	141
---	-----

## CHAP. XVI.

Abscesses of the cornea	144
-------------------------	-----

## CHAP. XVII.

Ulcers of the cornea and conjunctive	145
--------------------------------------	-----

## CHAP. XVIII.

Spots, specks and opacities of the cornea.	148
--	-----

## CHAP. XIX.

Staphyloma	150
------------	-----

## CHAP. XX.

Hypopion	154
----------	-----

## CHAP. XXI.

A closure or filling up of the pupil.	158
---------------------------------------	-----

## CHAP. XXII.

An inflammation of the choroid	160
--------------------------------	-----

## CHAP. XXIII.

A cataract	160
------------	-----

## CHAP. XXIV.

A gutta serena	179
----------------	-----

## CHAP. XXV.

Dropfy of the eye	183
-------------------	-----

## CHAP. XXVI.

Abscess of the eye	189
--------------------	-----

## CHAP. XXVII.

Cancer of the eye	190
-------------------	-----

---

## P R E F A C E.

**W**HETHER we consider the Eye with respect to its exquisite structure, its use in the animal oeconomy, or the pleasures and advantages of vision, we cannot but look upon it as one of the most admirable and important organs of the human frame. When we reflect likewise on the many painful and dangerous diseases it is liable to, arising as well from its necessary use, as from accidental causes; are we not justified in asserting, that, whoever shall contribute towards preserving it from injury, restoring it from a diseased to a healthy state, or remedying any of the defects of sight, will render a service by no means unacceptable or unimportant to mankind?

To be able, however, to perform any of these very essential services, it must be allowed

iv. P R E F A C E.

lowed that an accurate knowledge of the anatomy of this wonderful organ, a clear conception of the doctrine of vision, and a thorough acquaintance with the histories of the different diseases, and the most approved and successful methods of cure, are indispensibly necessary. Those, however, who are conversant with the principal authors in this part of medical science will, I believe, readily acknowledge, that however valuable they may have formerly been, yet several circumstances have since concurred to render them much less useful.

Considerable improvements have been made in the Anatomical, Philosophical, Medical, and Chirurgical parts. The Pharmaceutical remedies recommended by them, are now mostly obsolete. Several excellent observations have been also communicated to the public. But these are so scattered in a number of different publications, as to render it equally as unpleasant as difficult to consult them. To supply former deficiencies, to collect later improvements and observations, and to bring the whole into one point of view,



# P R E F A C E. v.

view, appeared worthy of some labour, and promised to be both useful and acceptable.

Influenced by this opinion, I published some time since a treatise on the Cataract, and have now endeavoured to give the public, a clear, concise, though, I hope, sufficiently comprehensive view of the Anatomical structure of the Eye, the Doctrine of Vision, the various diseases affecting this noble and useful Organ, and the best adapted methods of cure.

How far I have succeeded must be determined by an indulgent and impartial Public.

## C O N T E N T S.

77	A falling down of the superior eyelid
81	CHAP. II.
81	Lagophthalmos. The Horse's eye

# C O N T E N T S.

## P A R T I.

### CHAP. I.

#### An anatomical description of the Eye

Sect.		Page
1	<b>O</b> Of the eye in general and its orbit —	2
2	Of the external parts of the eye —	5
3	Of the globe of the eye with its contents —	22
4	Blood vessels of the eye, and its appurtenances	31
5	Nerves of the eye, and its appurtenances —	34

### CHAP. II.

#### Theory of Vision.

Sect.		
1	Of the nature and properties of light —	39
2	How vision is performed —	46

### CHAP. III.

#### Of Imperfect Sights.

Sect.		
1	A crepuscular, or twilight blindness —	54
2	A meridian blindness —	58
3	Myopia or short-sightedness —	59
4	Presbytia. Presbyopia. Long or old-sightedness	62
5	An absolute dulness of sight —	64
6	Oblique-sightedness —	68
7	Strabismus or Squinting —	70

## P A R T II.

### CHAP. I.

A	falling down of the superior eyelid —	77
---	---------------------------------------	----

### CHAP. II.

Lagophthalmos.	The Hare's eye —	81
----------------	------------------	----

CHAP.

A  
T R E A T I S E  
O N T H E  
Diseases of the E Y E.

P A R T I.

B

THE ARTIST

ON THE

Diseases of the N.Y.E.

PART I



## CHAPTER I.

### ANATOMICAL DESCRIPTION

#### OF THE

## EYE.

#### SECTION I.

##### *Of the Eye in general and its Orbit.*

**T**HE eye is an organ of a globular form, composed of coats, and humors of a peculiar sort, furnished with all sorts of vessels, and is situated below the forehead in a cavity entirely bony, called the *orbit*.

This cavity is formed by the juncture of seven bones: the first is the *os frontis*, which composes the superior part; the second, which

TREATISE

ON THE

Diseases of the EYE

PART I

is situated at the bottom of the orbit externally, is the great temporal apophysis of the sphenoid; it is a small part of the os sphenoides which enters into the composition of the orbit, viz. the transverse spinous process, which forms the bottom and superior part.

**ANATOMICAL DESCRIPTION**  
OF THE  
**EYE.**  
The cavity of the orbit, the fourth is the os maxillare superius, which forms the other half of the interior part; the fifth is the os maxillare inferius, which forms the lower part of the orbit behind the os maxillare superius; and the seventh is a small portion of the os palati, which makes the interior part of the fund of the orbit.

*Of the Eye in general and its Orbit.*

**T**HE eye is an organ of a globular form, composed of coats, and humors of a peculiar sort, furnished with all sorts of vessels, and is situated below the forehead in a cavity entirely bony, called the *orbit*.

This cavity is formed by the juncture of seven bones: the first is the *os frontis*, which composes the superior part; the second, which

is situated at the bottom of the orbit externally, is the great temporal apophysis of the *os sphenoides*; there is also another part of the *os sphenoides* which enters into the composition of the orbit, *viz.* the transverse spinous process, which forms the bottom and superior part; the third is the *os male*, which forms the small angle of the eye, and half of the inferior part of the cavity of the orbit; the fourth is the *os maxillare superior*, which forms the other half of the inferior part; the fifth is the *os unguis*, which forms the great angle of the eye; the sixth is the *os planum*, which forms the anterior part of the orbit behind the *os unguis*; and the seventh is a small portion of the *os palati*, which makes the inferior part of the fund of the orbit.

The orbit is pierced at its bottom, by the *foramen opticum* of the *os sphenoides*; adjoining to this hole is the *foramen lacerum* or large slit between the transverse spinous and orbital processes; and near this is the *spheno-maxillary slit* which is the large discontinuation of the external side of the orbit, left between the orbital processes of the sphenoid bone, the *os maxillare, male, and palati*. The whole cavity of the orbit is lined with a membrane, which is a production,



duction, or rather a continuation of the dura mater.

The organs of sight may be divided into two parts; the internal, which is the globe of the eye with its contents; and the external, which are those parts about the globe, subservient to, and encompassing it.

## S E C T. II.

### *Of the external Parts of the Eye.*

#### *Supercilia.*

THE first of the external parts, are the supercilia or eyebrows, which are two hairy arches placed above the orbits, and which are made to bunch out, by some fat which is under the skin in that place, and likewise by the eminence of that part of the frontal bone, which lies under them. They serve to defend the eyes from too strong a light, and also from sweat, dust, or insects which might otherwise fall into the eye. They are drawn obliquely downwards, and at the same time corrugated and made to approach

one

one another by means of the *corrugator coeuli*, which is a muscle arising from the great canthus of the orbit, precisely where the os nasi is joined to the anterior apophyse of the os frontis, from which origin it goes obliquely upwards, and terminates in the skin about the middle of the eyebrows: some anatomists will not allow this to be a distinct muscle, but only an oblique elongation of the frontal muscle; others think it a portion of the orbicularis palpebrarum. From the action of these muscles pulling down and corrugating the eyebrows, the eye is better defended against sweat, dust, or insects, and the rays of light are broke and intercepted when too strong, the depressed eyebrow forming a kind of shade over the eye.

The muscles which pull up our eyebrows are the *frontales*: they arise by a thin broad fleshy beginning from the upper part of the os frontis, from whence descending, they are inserted into the skin of the eyebrows, which they must therefore pull upward, that none of the light may be stoppt by them.

#### *Palpebræ.*

The palpebræ or eyelids are two veils stretched over the fore part of the eye, and cover-

covering it during the time of sleep. There are two in number to each eye, the one superior, the other inferior. They join at their two extremities, which are called, *cantbi* or angles: that next the nose is called the greater or internal angle, the other situated near the temples, the lesser or external angle.

The eyelids are composed of the epidermis, cuticle, or scarf skin, the cutis or true skin, the *membrana cellulosa*, the fibres of the orbicular muscle, a cartilaginous arch called *tarsus* to each lid, and several little glands.

The cutis is here very thin, and loosely extended over the eyelids, that it may the better accommodate itself to the convex figure of the eye, and that it may be moved backwards and forwards thereon with greater facility. It does not terminate at the extremity of the eyelids, but it is turned over to their inside, by lining which, it forms their inner membrane, and is then continued backwards as far as the edge of the orbit, from whence it is reflected, and continued forwards over the whole forepart of the globe of the eye, under the name of *membrana conjunctiva* or *adnata*, and terminates in the edge of the sclerotica, adjoining the cornea: this production of the cutis is every where covered by

ano-



another of the cuticle, even where it is closely conjoined with the cornea.

The membrana cellulosa is here very thin, because there is scarce any fat contained in its cellulae. To the margin of each eyelid is attached, a soft, thin, broad cartilage called *tarsus*, which is convex outwardly, concave on the side next the eye: it is broader in its middle, than at its extremities: the tarsus of the superior eyelid has about five lines in breadth, that of the inferior, two lines: the extremities on the side next the temples are more slender and narrower, than those next the nose. They serve to keep the eyelids equally extended over the eye, and disposes them to be moved backwards and forwards without falling into wrinkles. These cartilages are covered with the skin externally, and with the inner membrane of the eyelids internally. Upon the inner side next the eye, there is a range of small sebaceous glands called *ciliary glands*, or from their first discoverer, *glandulae Meibomia*. They separate a sort of balsam from the blood, which they send to the inner edge of the eyelids, by excretory ducts which open thereon. The use of this balsam is to defend the edges of the eyelids from being excoriated, where they strike upon one another, and to keep them from concretion in time



time of sleep, as sometimes happens, when from any disease in these glands, this ointment is either wanting, or has lost its balsamic quality.

The skin is pierced at the edge of the eyelid, for the passage of some hairs called *cilia*, or eye-lashes. They serve as a palisadoe to preserve and shade the eyes, as the eyebrows do, and to hinder any filth or flies from getting into them. Hence it is to be observed, that when these hairs are lost, a symptom which frequently follows a malignant small pox, and ulcerations of the edge of the eyelids, the sight is considerably impaired; the true reason of which is, that those hairs by breaking and intercepting the adventitious rays that come from the heavens, or other objects above the axis of vision, render the inward eye more dark; whence the picture on the retina becomes more clear and distinct: just as in a camera obscura, the picture is always the most distinct and lively, when no rays are allowed to enter it, but those that come from the object forming the picture.\*

\* From this we may see, why the sight is commonly best, when those hairs are black, and worst when they are very fair or white; for as black eye-lashes are the most proper for shading the eyes, so there is no light reflected from their inner side, which by entering the eye, might efface

The muscles wherewith the eyelids are moved, are first, the *elevator palpebræ superioris*. It arises from a small fleshy beginning from the bottom of the orbit, near the place where the optic nerves pierce the cranium, and passing over the *attollens oculi*, it becomes tendinous, as it marches over the bulb of the eye, whence growing still broader and thinner, it is inserted into the whole superior part of the cartilage of the upper eyelid. When this muscle acts, it lifts up the eyelid and discovers the eye.

The eyelids are brought together to shut upon the eye by another muscle, which because of

efface or weaken the picture on the retina; whereas white eyelashes reflect light copiously into the eye, from which this picture becomes faint and imperfect. *Monaltus* relates an account of one whose eyelashes, as well as eye brows and hair of his head were of an intense white, from which cause his sight was obscure during the day time, but clearer at night. This same person was taken by the Moors, who dyed his eye lashes black; upon which his sight was rendered immediately clearer; but the dye being washed off, his sight became obscurer. *Dr. Russell* in his natural history of Aleppo, says, that upon a principle of strengthening the sight, as well as ornament, it is become a general practice among the Turkish women to black the inside of their eyelids, by applying a powder called *Ismid*, and that this is sometimes practised by the men, but is then regarded as foppish.

of its figure, is called *orbicularis*. This is a thin fleshy muscle, about two fingers broad, whose fibres do circularly environ and cover the eyelids; the fibres of this muscle have almost all a common tendon situated transversely between the internal angle of the eye, and the nasal apophyse of the os maxillare: this tendon is slender, and appears ligamentous: it is very strong at its attachment to the bone, and diminishes as it approaches the angle of the eyelids, where it terminates at the union of the points or extremities of the tarfi. This muscle like the sphincters of other parts, constricts the eyelids, and brings them together over the eyes; and likewise when it contracts with a more than common force, it presses the globe of the eye inwards, by which means the glandula lachrymalis is compressed, and the tears contained therein, are squeezed out in greater plenty upon the eye for moistening and cleansing it, as occasion requires.

The use of the eyelids, is to cover the eye, to defend it against strong light,\* and other ex-

C 2

ternal

\* That our eyes may suffer from strong light, as well as from grosser matter, is obvious to every one's experience, and is further confirmed by the following examples: many of Xenophon's troops were blinded by the bright  
light



ternal injuries, and by their quick and frequent motion, to diffuse equally over the whole cornea, the liquor which comes from the glandula lachrymalis, by which means the eyes are continually moistened, washed, cleaned, polished, and made more transparent, for the better transmitting the rays of light.

*Glandula lachrymalis.*

Near the lesser angle of the eye, at the entrance of the superior part of the orbit, and in a sinus formed in the orbit itself for the more convenient reception of it, lies a gland, surrounded by fat, and of the conglomerate kind, called *glandula lachrymalis*, or *inominata*. This gland is very large, and extends from the external angle to near its middle. From this lachrymal gland in horned cattle, descend three, four, or more visible ducts, which open on the

light reflected from the snow, through which they were obliged to march. *Dionysius* the tyrant of Sicily, used to bring forth his captives from the dark dungeon in which they were confined, into a white well lighted room, by which sudden transition, they were immediately blinded. *Attilius Regulus* had his eyelids cut off by the Carthaginians, and was then exposed to the sun, whose light he could not long bear, without being blinded.

inner



inner side of the conjunctiva, upon the eyelid; but they have never yet been seen in the human species.

The tears are exhaled partly from the arteries of the conjunctiva, and internal membrane of the eyelids, as we see from an imitation of nature, by injecting water; and they are in part believed to proceed from this lachrymal gland. This liquor is continually, though but in a small quantity, poured out upon the eye, and by the twinkling motion of the eyelids, is equally diffused over the whole cornea, for the purposes of keeping it moist, clean, and transparent; but upon particular occasion, when our eyes are any ways darkened, or suffer any pain or itching, by being long exposed to drying winds, smook, or dust, or upon certain affections of the mind, this liquor is poured out upon the eyes in greater plenty, because then the orbicular muscle, contracts more frequently, and with a more than ordinary force, and by pressing the globe of the eye inward, compresses the parts where the tears are secreted, and by that means forces out their contents.

*Puncta lachrymalia. Saccus lachrymalis. Ductus nasalis.*

In the great canthus of the eye, there are two small papillæ standing out, having each of them one opening, surrounded by callous flesh, which are perpetually open, unless when convulsively closed, and are large enough to receive a hog's bristle, they are called *puncta lachrymalia*. These holes are in the inner side of the eyelids, near their edge, one in each lid: they lead to two small canals, called *lachrymal canals*, which approaching one another are inserted into a common receptacle, called *saccus lachrymalis*. This is a small, membranous, oblong bag, situated in the great canthus behind the caruncula lachrymalis, and lies in a bony channel, formed by the nasal apophyse of the os maxillare and the os unguis. From the bottom of this sac, there goes a small pipe or canal, called the *ductus nasalis*, which is nothing but a continuation of the lachrymal sac. It descends a little obliquely backwards, from the nasal margin of the orbit, towards the bottom of the lateral part of the internal nostril of the same side, where its inferior extremity opens on the side of the maxillary sinus, under the lower os spongiosum, nearly at that place which by a vertical line answers to the interstice of the second and third molaris.

*Carun-*

*Caruncula lachrymalis. Valvula semilunaris.*

The caruncula lachrymalis is a little reddish mass, situated in the great angle of the eye, in the middle betwixt the puncta lachrymalia, but a little nearer the nose: being viewed with a microscope, it appears entirely glandulous, resembling the conglomerate sort; a quantity of small fine hairs are also discoverable, which appear besmeared with an oily matter, more or less yellow. On one side of this little glandulous body, is a semilunar fold, made by the conjunctive, convex on the side next the nose, concave on the side next the pupil, and which descending perpendicularly joins the eyelids: it is called *valvula semilunaris*.

The lachrymal juice, which is continually flowing out upon the eye, for the purpose of washing, cleansing, and moistening the cornea, is determined to flow along the edge of the under eyelid to the great canthus. The mechanism by which this is effected, consists in the following particulars. First, the position of the eyelids is such, that the angle which they make, by their conjunction at the external canthus, is much more acute than that made, at their internal canthus; and therefore, when we shut our eyelids, the whole of their edges do not touch

one



one another at once, but begin first to touch at the external canthus, where the angle is smallest, and from thence they proceed successively to touch one another through their whole length, till last of all, that they touch at the internal canthus, where the angle is greatest. It is evident therefore, that this successive shutting of the eyelids, must necessarily determine the tears which flow down the eye, till they are stoppt by the edge of the under eyelid, to run along this edge, towards the great canthus; more especially as this canthus is somewhat lower than the external one.

A second thing which contributes to this end, is the disposition of the edges of the eyelids themselves, which when shut by the contraction of the orbicular muscle, do touch one another very closely externally; but internally, at their inner edge, they at first do not at all touch, but leave a sort of triangular furrow, on the inner edge of the under eyelid, along which the tears are pressed by the further contraction of the orbicular muscle, which by pressing the eyelids together with much force, obliterates this furrow, first towards the external angle, and thence successively to the internal angle, which last of all, is effaced. These are the causes, which determine the tears to run along the  
edge



edge of the eyelids to the great canthus, and the reasons why any particle of sand or dirt getting into the eye, is thereby soon carried to that place.

By means of this mechanism, the lachrymal juice, together with the dust and filth washed off the cornea, is transmitted to the greater canthus, where is a small cavity formed for their reception; for in this angle is placed the *caruncula lachrymalis*, which by its protuberancy hinders the inner surfaces of the eyelids from applying themselves closely to the subjacent parts; and therefore there is a small void space preserved at the basis of this caruncle, into which the tears are collected.

The use therefore of this caruncle is. First, to form and preserve a small cavity in the great canthus for the reception of the lachrymal juice. Secondly, to hinder this juice from running out upon the face at the great canthus, which it would do, were it not stopt by this caruncle; for the eyelids when shut, do but slightly touch one another, at their conjunction in this angle. Thirdly, to keep the *puncta lacrymalia* open, which otherwise would be stopt, by having their orifices applied to the subjacent parts; for this caruncle, as was said before, by its protu-

D

berancy,

berancy, forms a small empty space at its basis, into which the tears are collected; it is into this cavity, the mouths of the puncta lachrymalia gape, which must therefore receive the tears contained therein, and transmit them to the sacculus lachrymalis, from which they are carried by the ductus nasalis, into the cavity of the nose.

When the quantity of lachrymal juice is so great, as that all of it cannot pass by the puncta, as frequently happens upon any violent passion of the mind, such as grief, anger, joy, &c. or from irritating particles getting into the eye, then it flows down the cheeks in form of tears.

#### *Muscles of the eye.*

The motions of the eye are performed by means of six muscles, whereof four are strait, and two oblique.

The first of the four strait muscles is situated upon the superior part of the globe upon which it lies. It pulls up the eye when we look up, and is therefore called *attollens*. The second is directly opposite to the *attollens*, and is situated upon the under part of the eye, which

which it pulls down, and is therefore called *deprimens*. The third and fourth are at the sides of the eye, and draw it towards the nose, or from it towards the little angle: that which draws it towards the nose is called *adductor*; that which pulls it from the nose towards the little angle, *abductor*. These muscles are attached by their posterior extremities in the bottom of the orbit, near to the optic foramen, to the production of the dura mater by short and narrow tendons; from thence they go fleshy towards the great circumference of the convexity of the globe, between the optic nerve and the cornea transparens, where they widen by very flat tendons, and so broad that they touch one another, and afterwards unite. These tendons attach themselves at first by a particular insertion to the circumference just spoken of, and after that continue their adherence even to the cornea, forming the *tunica albuginea*, is nothing else but the tendinous expansions of the four strait muscles of the eye.

When the four strait muscles act separately, they must of course elevate, depress, or turn the globe of the eye, either to the nose or to the temple. But when the attollens and adductor, or abductor, or when the deprimens and adductor or abductor act together, they perform



the oblique motions, which have been attributed to the oblique muscles. When they act successively, they give the globe a rotatory motion; and when all four act together, they draw the whole eye inwards, towards the bottom of the orbit.

The oblique muscles of the eye are two in number, whereof one is called *obliquus major* or *inferior*, or *trochlearis*, the other *obliquus minor* or *superior*.

The obliquus superior is attached by a narrow tendon at the bottom of the orbit, between the attollens and adductor, from whence it runs obliquely by the side of the orbit, opposite the interval of these two muscles, towards the internal angular apophyse of the os frontis; at this place it terminates by a slender tendon, which passes through a kind of cartilaginous ring or trochlea affixed to the os frontis, and is afterwards reflected backwards and downwards, being included in a capsule of its own, and at last is inserted into the globe, a little posteriorly and laterally towards the nose.

The obliquus inferior is situated obliquely at the lower part of the orbit under the depri-mens, and is attached by one extremity, a little tendinous,



tendinous, to the root of the nasal apophyse of the os maxillare, towards the edge of the orbit between the opening of the nasal duct, and the inferior orbitary fissure; from thence it passes obliquely, and a little transversely backwards under the deprimens, and goes to attach itself to the lateral posterior part of the globe, by a flat tendon opposite, and at a little distance from the tendon of the obliquus superior or trochlearis.

When the obliquus superior acts it draws the eye forwards, and turns its pupil downwards.

When the inferior oblique acts it brings the eye forwards, and directs the pupil upward.

The spherical figure of our eyes, and their loose connection to the edge of the orbit by the tunica conjunctiva, which is soft, flexible and yielding, does excellently dispose them to be moved this or the other way, according to the situation of the object we would view; and besides, there is a great deal of fat placed all round the globe betwixt it and the orbit, which lubricates and softens the eye, and renders its motions more easy.

## S E C T. III.

*Of the Globe of the Eye with its Contents.*

THE globe of the eye, if the protuberance of the cornea be excepted, is almost perfectly globular; nevertheless, it is somewhat compressed anteriorly, and is rather longer than it is broad: it begins from a considerable nerve called the optic nerve, and is formed principally by three tunics or coats, and three humors contained in those coats: the first or external coat is called the *sclerotica*, the second *choroides*, and the third *retina*: the humors beginning at the forepart of the eye, are the *aqueous*, the *crystalline*, and the *vitreous*. We will describe these parts in the order here mentioned.

*Optic Nerves.*

The optic nerves arise from the thalami nervorum opticorum, and then after making a large curve outwards, run obliquely inwards and forwards till they unite at the forepart of the sella turcica, and then dividing again, each runs obliquely forwards and outwards to go out at its proper hole in the sphenoidal bone, to run afterwards to the globe of the eye into  
which

which it is inserted, not in the middle, but a little nearer to the nose.

During the passage of the optic nerves out of the cranium, they receive a covering from the dura mater, and at the internal edge of the foramen opticum, the dura mater is divided into two lamina, one of which adhering to the bones, forms the periosteum of the orbit, and the other closely embraces the nerve like a sheath, and is continued with it to the globe of the eye.

*Sclerotica. Cornea transparent.*

The *sclerotica* or *cornea opaca*, as it is sometimes called, is composed of several plates closely joined together; its substance is very hard and compact, resembling a kind of parchment; it is very thick while contiguous to the optic nerve, but gradually diminishes in thickness as it advances forwards. It is of a globular figure, and to the forepart of this globe, pierced with a circular hole, is prefixt obliquely a portion of a more convex or less sphere, pellucid and made up of many scales or plates, more evidently distinct than those of the *sclerotica*, and between which is lodged an exceedingly transparent liquor: this is called *cornea transparent*,

*transparens*, or imply the *cornea*, and is the part through which the light passes to the internal parts of the eye.

### *Choroides.*

The choroides is a soft, tender coat, composed of innumerable vessels, and which being concentrically expanded within the sclerotica from the insertion of the optic nerve to the origin of the cornea, lines its internal surface, with which it is connected, by means of cellular membrane and many vessels. The choroides is outwardly of a brown colour, but inwardly of a much deeper brown; almost black. *Rayseb* says the choroid is composed of two distinct membranes, the internal of which he calls *tunica ruyfchiana*, and the other choroides. When this coat is arrived at the circumference of the cornea *transparens*, it is attached strongly by means of a good deal of cellular membrane, to the sclerotica at the place of its union with the transparent cornea, thereby forming a kind of white, circular, and narrow band called *orbiculus ciliaris*; from thence it changes its direction, and goes directly inwards towards the axis of the eye; it is then no longer called choroides, but the anterior surface, which is of various



various colours in various persons is called *iris*; the posterior surface, which is covered with a black pigment, *uvea*, and the round hole observable in the middle of it, the *pupil*.

Behind the *uvea* are observeable short, oblong, white fibres, arising by fine pale lines or streaks, scarce perceptible, from the inside of the choroides near the orbiculus ciliaris, and which becoming gradually thicker, whiter and closer, run over the forepart of the vitreous humor, where they are received into slight depressions or furrows, to which they are strongly adherent, and terminate at the margin of the chrystalline lens: these are called *ciliary ligaments* or *processes*, and their interspaces are every where filled up with a black pigment, such as besmears the internal surface of the choroides, and back of the *uvea*.

The choroides is quite opake in all its parts, by which means it allows no light to pass but what enters by that circular hole in its forepart called the pupil: and this opacity is yet more encreased by a black pigment with which it is all over covered, and which makes this membrane appear black, though it be really white, as any body may be assured of by scraping and washing off this colour which easily separates.

E

The

The pupil has no fixed measure, being greater or smaller according as more or less light shines upon the eye. When the light is strong, or the visual object too luminous, we contract the pupil for intercepting a part of the light, which would otherwise dazzle and hurt our eyes; but when our eyes are in no danger of being hurt by the light, and especially if the light is so weak as to make but a faint obscure picture on the retina, we enlarge this aperture that more light may enter the eye for making a sufficient impression on this membrane. This aperture also contracts at the near approach of any small object when we endeavour to view it distinctly \*. In a foetal state, the place of the pupil is entirely occupied by a thin vascular membrane called *membrana pupillaris*, so that the iris appears imperforate; but this appearance vanishes before the birth.

*Retina.*

\* From this power of contraction and dilatation, many anatomists have attributed muscular fibres to the iris, and have even spoke of its having two sets of muscular fibres; one longitudinal, for the purpose of enlarging the pupil, the other, orbicular, which operates like a sphincter, and contracts the pupil. But *Morgagni* asserts that he never could, even with the assistance of glasses, perceive any muscular fibres. *Haller* is so silent concerning any muscles belonging to the iris, that he attributes the dilatation and constriction of the pupil, solely to the weaker or stronger afflux of humours into the vessels of the iris. *Zinn* also thinks it impossible, with the best microscope, to discover any muscular

*Retina.*

Immediately under the choroides lies the third and last membrane of the eye, called *retina*, which is a fine expansion of the medullary part of the optic nerve. It is whitish, soft, and tender; immediately embraces the vitreous humour, and extends from the insertion of the optic nerve to the extremities of the ciliary processes.

These coats of the eye include its humors, which are three transparent substances, the one a solid, the other a soft body, and the third truly a liquor. They are called the *aqueous*, the *chrystalline*, and the *vitreous*.

*Aqueous humor.*

The aqueous humor is a liquor very limpid and liquid, and fills up the space which is between the cornea transparens and the iris, and the space between the uvea and the chrystalline, as well as the hole of the pupil. These two spaces are called by the name of *chambers*, and are relating to their situation, divided into *an-*  
*cular fibres*. He however adds, that from the phenomena, and structure of the iris, and also from analogy, he is almost inclined to think that it must have muscular fibres intermixt with the vessels and nerves on the anterior face of the iris.



terior and posterior. These two chambers of the aqueous humor are of different extent : the anterior, which is between the cornea transperans and the iris, is the greatest of the two : the posterior, which lies hid between the uvea and the chrystalline, is very narrow, especially towards the pupil, where the uvea almost touches the chrystalline. This humor is imagined to be exhaled from the small arteries of the iris, uvea and ciliary processes, and to be again absorbed into small veins of the same parts, while some portion is imbibed and exhaled through the cornea ; when it has escaped through a wound of the cornea, and the cornea has thereby become flaccid, in a few days, it again becomes plump from a fresh supply of this humor.

*Chrystalline.*

The second humor of the eye, is called the chrystalline, because it resembles the purest chrystal in transparency \*. Its substance is by much the most firm and hard of any of the humors, and is made up of many thin spherical lamina or plates lying within each other, like the different pellicles or plates which compose

\* The chrystalline humor is altogether colorless, till about the age of 30, at which time it begins to contract a yellowness which afterwards gradually encreases, so that at the age of 70 or 80, it is of the colour of amber : it nevertheless does not lose its transparency.



an onion. It is not throughout of the same consistence, being outwardly like a thick jelly, but towards the center as consistent as hard suet. It is of a lenticular figure, being convex on both sides; but its forepart which regards the pupil, is not so convex as its posterior side next the vitreous humor. The whole of it is contained in a firm, elastic, thick, transparent coat or capsule, called *tunica aranea*, the anterior part of which is thicker, stronger, and denser than the posterior. This capsule has always a little water contained between it and the chrystalline. Into the anterior part of this capsule, a little beyond the great circumference of the chrystalline, is inserted the membrane of *Petitis canal*, as will be seen in the description of the vitreous humor: The chrystalline humor is situated exactly behind the pupil, not in the middle of the eye, but a good deal nearer its fore than its back part: its axis coincides with the axis of the eye. The aqueous humor fills up all the distance betwixt it, and the cornea, as the vitreous does that, betwixt it and the retina. We have said that this humor is convex upon both sides, and that its back part is the most convex. Now this convexity of its posterior face is all received into an equal concavity in the fore part of the vitreous or glassy humor.

*Vitreous.*

*Vitreous humor.*

The third humor of the eye is the vitreous, which is of a middle consistence betwixt that of the aqueous and chrystalline humors. It is the largest of all the humors of the eye, and fills the whole back part of the globe, from the chrystalline and ciliary ligaments to the retina. The middle of its fore part has a small cavity in which the whole posterior face of the chrystalline lies. This humor, as well as the chrystalline, has a very fine coat which covers it all round, and is called *tunica vitrea*. The fabric of the vitreous humor is cellular, its substance being divided by a very fine transparent membrane into cellules or little membranous compartments, containing a very transparent liquor. In the same plane where the ciliary ligaments are produced from the choroides, there arises a little membrane or girdle from the tunica vitrea, immediately detached from, although contiguous to it, which passing between the vitreous humor, and the ciliary ligaments, gradually recedes more and more from the vitreous humor, as it approaches nearer to the chrystalline humor, and is at last inserted into the capsule of the chrystalline, at its anterior convexity, just beyond its great circumference; so that by this means, a small, triangular, curvelined space,  
is

is left between the vitreous body and this membrane: this ring is interrupted by several little divisions, occasioned by strong, transverse, short fibres, which running over the membrane, bind and contract it, at intervals. *Petit* was the first discoverer of this ring, and borrowing a word from the goldsmiths, he called it in French, *canal godronné*; but in books of anatomy, it is, for the most part, called from its discoverer, *canalis Petitianus* \*.

#### S E C T. IV.

*Blood vessels of the Eye, and its Appurtenances.*

THE external carotid artery, by means of the external maxillary, temporal and frontal arteries, give a great many branches to the teguments which surround the eye, and to all the portions of the orbicular muscles; which branches communicate with those that are distributed to the membrana conjunctiva of the eyelids, and to the caruncula lachrymalis.

The same external carotid, by means of its branch, the internal maxillary artery, sends a

\* See Zinn, *Descrip. anatom. ocul. hum.* p. 123, 4.

considerable

considerable branch into the orbit, through the inferior orbital or sphenomaxillary fissure, which is distributed to the periosteum of the orbit, to the muscles of the globe of the eye, to the levator palpebræ superioris, to the fat, glandula lachrymalis, membrana conjunctiva, caruncula lachrymalis, &c. It communicates with the internal carotid, and sends off a small artery which goes to the ethmoidal cells of the nose, through the little internal posterior orbital hole.

The internal carotid artery having entered the cranium, sends off small branches, which accompany the optic nerve, and the nerves which pass through the sphenomaxillary fissure. One of these small arterial branches insinuates itself into the substance of the optic nerve, and produces on the retina those small arteries, which are seen pretty distinctly on the inner sides of that membrane. The others join the small ramifications of the external carotid already mentioned, and having penetrated into the substance of the sclerotica, on its posterior part, and run for a little way onwards in its substance, they pierce it internally in four or five places, at nearly an equal distance between the optic nerve and the pupil; and afterwards pierce in as many places, the external lamina of the choroides,



choroides, and form between that, and the internal lamina, the *vasa vorticosa* of *Steno*, so called from their vortical direction. There are also observable some small vascular filaments, adhering very closely to the tunica vitrea; these same little arterial branches, before they form the *vasa vorticosa*, send, in nearly a direct course, small arteries to the circumference of the uvea, which form in its substance a sort of vascular circle, from whence capillary branches go off as far as the membrane of the chrystalline.

The veins of all these parts answer nearly to the arteries. The internal veins empty themselves partly into the internal jugular veins, by the orbitary, cavernous, and petrous sinusses, and partly into the external jugular vein, by the external maxillary, internal maxillary, temporal veins, &c. Besides the capillary vessels, easily distinguishable by the red colour of the blood, there are great numbers of those which admit only the serous and lymphatic parts of the blood, and consequently do not appear while in their natural state. They become visible in some places by inflammations and injections; as on the membrana conjunctiva.

F

S E C T.

## S E C T. V.

*The Nerves of the Eye, and its Appurtenances.*

BESIDES the optic nerve already described, the globe of the eye receives several small nerves, which creep on each side, along and about the optic nerve from its entrance into the orbit, to its insertion in the globe. These filaments come principally from a small lenticular ganglion, formed by very short branches of the orbitary or ophthalmic branch of the fifth pair, and by a branch of the third pair or *motores oculorum*. These nervous filaments of the small lenticular ganglion having reached the globe of the eye, divided into five or six fasciculi, which surround the optic nerve, and afterwards piercing the *sclerotica*, they run between that and the *choroides* towards the iris, where being divided into several short filaments, they terminate in its substance.

The nerves which go to the other parts belonging to the eye, come from the third, fourth, sixth and two first branches of the fifth pair of nerves of the *medulla oblongata*, and likewise from the *portio dura* of the seventh pair. The third, fourth, and sixth pairs give nerves to the muscles of the globe of the eye. The two  
branches

branches of the fifth pair, and the portio dura of the seventh give nerves not only to the other parts which surround the globe, but also to the frontal muscles and internal parts of the nose.

The trunk of the third pair having entered the orbit, through the superior orbitary or sphenoidal fissure, produces four branches. The first runs upward and divides into two; one for the attollens muscle, and the other for the levator palpebræ superioris. The trunk continuing its course, gives off the second short branch to the depressens. The third branch is long, and goes to the obliquus inferior, contributing likewise to the formation of the lenticular ganglion before mentioned. The fourth branch is large, and goes to the adductor muscle.

The first branch of the fifth pair, commonly called the ophthalmic branch, passes through the foramen lacerum into the orbit, and then divides into three branches; one superior called the frontal or superciliary branch; another internal, called the nasal branch, and the third external, called temporal or lachrymal.

The frontal or superciliary branch runs all along the periosteum of the orbit, and having passed through the superciliary notch or foramen

of the os frontis, is distributed to the frontal, corrugator coiteri, and superior portion of the orbicularis palpebrarum muscles; and it communicates with a branch of the portio dura of the seventh pair.

The nasal branch passes under the ramification of the nerve of the third pair, and running to the side of the nose is distributed thereto, and to the neighbouring part of the orbicularis, caruncula lachrymalis, &c. This branch sends off a filament, which passing through the internal, anterior, orbital hole, enters the cranium, and presently returns again through one of the ethmoidal holes, to the internal parts of the nose.

The temporal branch which is sometimes a subdivision of the superciliary, is distributed to the glandula lachrymalis, and sends off a filament, which pierces the orbital apophysis of the os malæ.

The second branch of the fifth pair, called the superior maxillary, sends off a twig through the bony canal of the lower part of the orbit, which going out at the anterior, inferior, orbital hole, is distributed to the neighbouring  
portion



portion of the orbicularis, and communicates with a branch of the portio dura.

The portio dura of the seventh pair or auditory nerve, gives branches to the superior, inferior and external lateral parts of the orbicularis palpebrarum, one of which communicates with the frontal, and another with the suborbital nerve.

## C H A P.

Section of the ... and ...  
of a branch of the ...

The ... of ...  
...  
...  
...  
...  
...  
...

...

---

## CHAP. II.

# THEORY OF VISION.

### SECT. I.

#### *Of the Nature and Properties of Light.*

**L**IGHT is said to consist of matter infinitely small, lodged originally in the great body of the sun, and from thence transmitted in radiated lines, with an incredible velocity (it moving at the rate of ten millions of miles in a minute) which falling upon the external surfaces of objects, and being from thence reflected into the eye, renders them apparent, and is thus the *material cause* of vision.

The light in passing out of air into any transparent body, does not persist in the same direction it had before its entrance, but is inflected or turned inwards. For example, let A, B, C, D,  
fig.

fig. 1. represent a portion of water, or glass, A, B, the surface of it, upon which the ray of light E, F, falls obliquely; this ray shall not go right on in the course delineated by the line F, G, but be turned off from the surface A, B, into the line F, H, less inclined to the surface A, B, than the line E, F, is, in which the ray is incident upon that surface. On the other hand, when the light passes out of any such body into the air, it is inflected the contrary way, being after its emergence rendered more oblique to the surface it passes through, than before. Thus the ray F, H, when it goes out of the surface C, D, will be turned up towards that surface, going out into the air in the line H, I.

This turning of the light out of its way, as it passes from one transparent body into another, is called its *refraction*. Both these cases may be tried by an easy experiment with a basin and water. For the first case set an empty basin in the sunshine or near a candle, making a mark upon the bottom at the extremity of the shadow cast by the brim of the basin, then by pouring water into the basin, you will observe the shadow to shrink, and leave the bottom of the basin enlightened to a good distance from the mark. Let A, B, C, fig. 2. denote the empty basin, E, A, D,



E, A, D, the light shining over the brim of it, so that all the part A, B, D, be shaded. Then a mark being made at D, if water be poured into the bason, (as in fig. 3.) to F, G, you shall observe the light, which before went on to D, now to come much short of the mark D, falling on the bottom in the point H, and leaving the mark D a good way within the enlightened part; which shews that the ray E, A, when it enters the water at I, goes no longer straight forwards, but is at that place incurvated, and made to go nearer the perpendicular. The other case may be tried by putting any small body into an empty bason, placed lower than your eye, and then receding from the bason, till you can but just see the body over the brim. After which, if the bason be filled with water, you shall presently observe the body to be visible, though you go farther off from the bason. Let A, B, C, fig. 4. denote the bason as before, D the body in it, E the place of your eye, when the body is seen just over the edge A, while the bason is empty. If it be then filled with water, you will observe the body still to be visible, though you take your eye farther off. Suppose you see the body in this case just over the brim A, when your eye is at F, it is plain that the rays of light, which come from the body to your eye, have not come  
G straight

straight on, but are bent at A, being turned downwards, and more inclined to the surface of the water, between A and your eye at F, than they are between A and the body D.

It is by means of this power of refraction, that a ray of light let through a small hole of a window shut in a darkened room, and transmitted through two surfaces of a prism, will, on a white paper held at a proper distance from the prism, exhibit an image made up of the following colours, and in this order, viz. red, orange, yellow, green, blue, indigo, violet. For the light is not a simple homogeneous body, but composed of heterogeneous and dissimilar rays, which in like incidences, are endued with different degrees of refrangibility. By this property in them, in the passage of the light through the prism, every simple ray undergoes that degree of refraction which is peculiar to itself, and as every ray has a different degree of refrangibility, some more, and some less, they will take different directions, and of course be separated one from another, and thus decomposed, will put on the appearance of red, blue, &c. which when all blended together, gave that appearance of whiteness, under which we see the rays of light, before they undergo this experiment. If we place a convex glass between  
the

the paper and the prism, it will collect the rays together, which were separated by the prism, and thus blending and incorporating them, the image represented upon a paper placed at the focus of the convex lens (or that spot where the rays are all converged to a point) will be white, but if the paper be nearer the glass than the focal distance, it will have painted on it the different colours, in a more vivid or fainter degree, as the paper recedes or advances to the focal distance, as the rays though converged and tending to one another immediately after their passage through the glass, yet are not intimately united till arrived at the focus.

Another property of light is, its reflexivity or its disposition to be turned back into the same medium, by any other medium upon whose surface it falls. And in this it observes the same law that other bodies do in their reflexions, viz. the angle of reflection is always equal to the angle of incidence. For example, let B, fig. 5. represent a hole in a window shut, A, B, C, a beam of the sun's light falling on a looking glass G, C, F, at C. This beam shall after its incidence at C, be reflected back in the line C, D.



From the looking glass at the point of incidence  $C$ , raise the perpendicular  $C, E$ ; the angle  $A, C, E$ , which the incident beam  $A, C$  makes with the perpendicular  $C, E$ , is the angle of incidence; and the angle  $D, C, E$ , which the reflected beam  $C, D$ , makes with the same perpendicular  $C, E$ , is the angle of reflection. Now these angles upon measuring them, are always found equal.

Having seen that the light is compounded of rays of many different colours, and that more or less is always reflected from the surface of objects, wherever it happens to fall, we shall readily conceive why bodies appear in open day light of such different colours, which is owing to nothing more, than such a constitution of the particles of an object, as disposes it to reflect the rays of one colour in greater abundance than the rays of any other.

As nothing more is required to make bodies look white, than a power to reflect indifferently rays of every colour, so blackness is produced by a suffocation and absorption of the incident light, which being stopped and suppressed in the black body, is not reflected outward, but enters the body, and is often reflected and re-  
fracted



fracted within the body, until it be stifled and lost.

It is the irregular reflections and refractions of light through the substance of bodies, owing to their pores being numerous and large, which renders bodies opake, as on the contrary, their transparency arises from the light being transmitted through them in right lined directions, which is the case whenever the particles lie contiguous one to another, and no interstices occur to disturb the straight lined transmission of them.

It will be understood from what has been said above, that when light falls upon the surface of glass obliquely, after its entrance into the glass, it is more inclined to the line drawn through the point of incidence perpendicular to that surface, than before. Suppose a ray of light issuing from the point A, fig. 6. falls on a piece of glass B, C, D, E, whose surface B, C, whereon the ray falls, is of a spherical or globular figure, the center whereof is F. Let the ray proceed in the line A, G, falling on the surface B, C, in the point G, and draw F, G, H. Here the ray after its entrance into the glass will pass on in some line, as G, I, more inclined toward the line F, G, H, than the line A, G, is inclined thereto; for the line F, G, H, is perpen-

perpendicular to the surface B, C: in the point G. By this means, if a number of rays proceeding from any one point, fall on a convex spherical surface of glass, they shall be inflected (as is represented in fig. 7.) so as to be gathered pretty close together about the line drawn through the center of the glass from the point, whence the rays proceed: which line is called the axis of the glass.

If the light fall on a concave spherical surface, after refraction it shall spread quicker than before, as in fig. 8. unless the rays proceed from a point between the center, and the surface of the glass.

The rays, which spread themselves from a point, are called *diverging*; and such as move toward a point, are called *converging* rays. And the point in the axis of the glass, about which the rays gather after refraction, is called the *focus* of those rays.

## S E C T. II.

### *How Vision is performed.*

**W**HETHEREVER the rays which come from all the points of any object meet again in so many

To front p. 46.

Fig. 1.

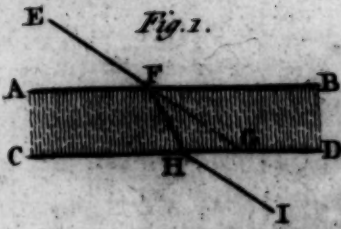


Fig. 2.

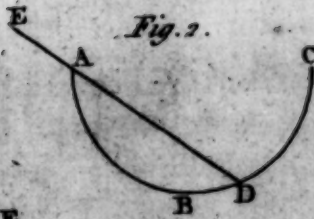


Fig. 3.



Fig. 4.



Fig. 5.

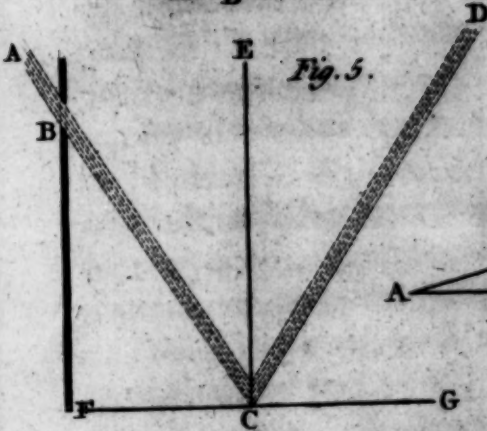


Fig. 6.

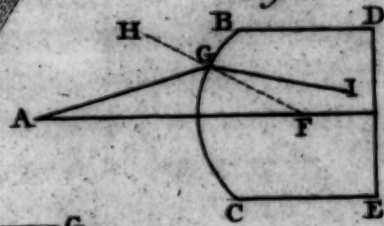


Fig. 7.

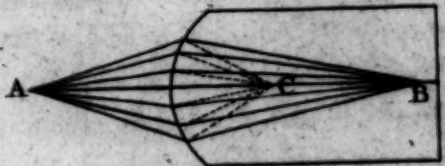
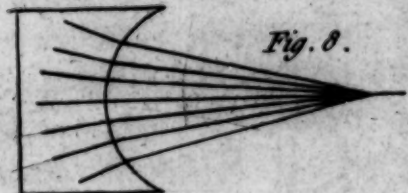


Fig. 8.







many points, after they have been made to converge by refraction, there they will make a picture of the object upon any white body on which they fall.

**Demonstration.** Let P, R, fig. 1. plate 2. represent any object without doors, and A, B, be a lens placed at a hole in the window shut of a dark chamber, whereby the rays that come from any point Q of that object are, by the refractive power of the glass, turned out of their straight course, and made to converge and meet again in the point q; if a sheet of white paper be held at q for the light there to fall upon it, the picture of that object P, R, will appear upon the paper in its proper shape and colours. For as the light which comes from the point Q, goes to the point q; so the light which comes from the other points P, and R, of the object will go to so many other correspondent points p, and r, (as is manifest from the laws of refraction above explained.) So that every point of the object shall illuminate a correspondent point of the picture, and thereby make a picture like the object in shape and colour, this only excepted, that the picture shall be inverted. And this is the reason of that vulgar experiment of casting the species of objects from abroad, upon a wall or sheet of white paper in a dark room; which

which is therefore an experimental proof of the truth of the above mentioned assertion.

Now this representation of objects upon a sheet of white paper, by means of a lens placed at a hole in the window shut of a dark room, is perfectly similar to what happens in our eyes when we view objects; for vision, in so far as our eyes are concerned, consists in nothing but such a refraction of the rays of light by the transparent skins and humors of the eye, as is necessary to unite and bring together the rays which come from the several points of the object in so many corresponding points in the bottom of the eye, and there to paint the picture of the object upon the Tunica Retina, with which the bottom of the eye is covered; which picture being propagated by motion along the fibres of the optic nerve into the brain, is the cause of vision: For accordingly as these pictures are perfect or imperfect, the object is seen perfectly or imperfectly.

Thus in general vision is performed. But, in order to understand how the several humours of the eye conduce to the forming of this image or picture, see fig. 2, where Z is the eye, and Bt, Bs, B $\mu$ , &c. are rays coming to the eye from the point B, of the object A, B, C, placed at a convenient

convenient distance before the eye ; of these rays it is obvious, that the middle one  $Bs$  being in the axis of vision, must fall perpendicularly upon all the humors of the eye, as it passes through them to the *retina*, and consequently must move straight forward to  $b$  in the bottom of the eye, without suffering any refraction : but the other rays as  $Bs$ ,  $Bu$ , &c. by falling obliquely upon the transparent cornea, which being of equal density with the aqueous humor, must have the same refractive power ; I say, these other rays, by falling obliquely on the cornea, which is denser than the medium of air through which they passed, will be refracted towards the perpendicular ; let therefore  $b, p$ , and  $b, p$ , be drawn perpendicular to the cornea, at the points of incidence  $s$ , and  $u$  ; it is evident, that these rays, by being refracted towards these perpendiculars, will be made to approach one another, because the perpendiculars themselves do so ; and this is the first refraction which the rays suffer in falling upon our eyes, by which they are brought nearer to one another, that more of them may pass through the pupil, and may not be lost upon the uvea.

A second refraction which those rays suffer, is in passing out of the aqueous humor into the chrySTALLINE ; by which refraction they are made to approach still more to one another than be-

H

fore ;

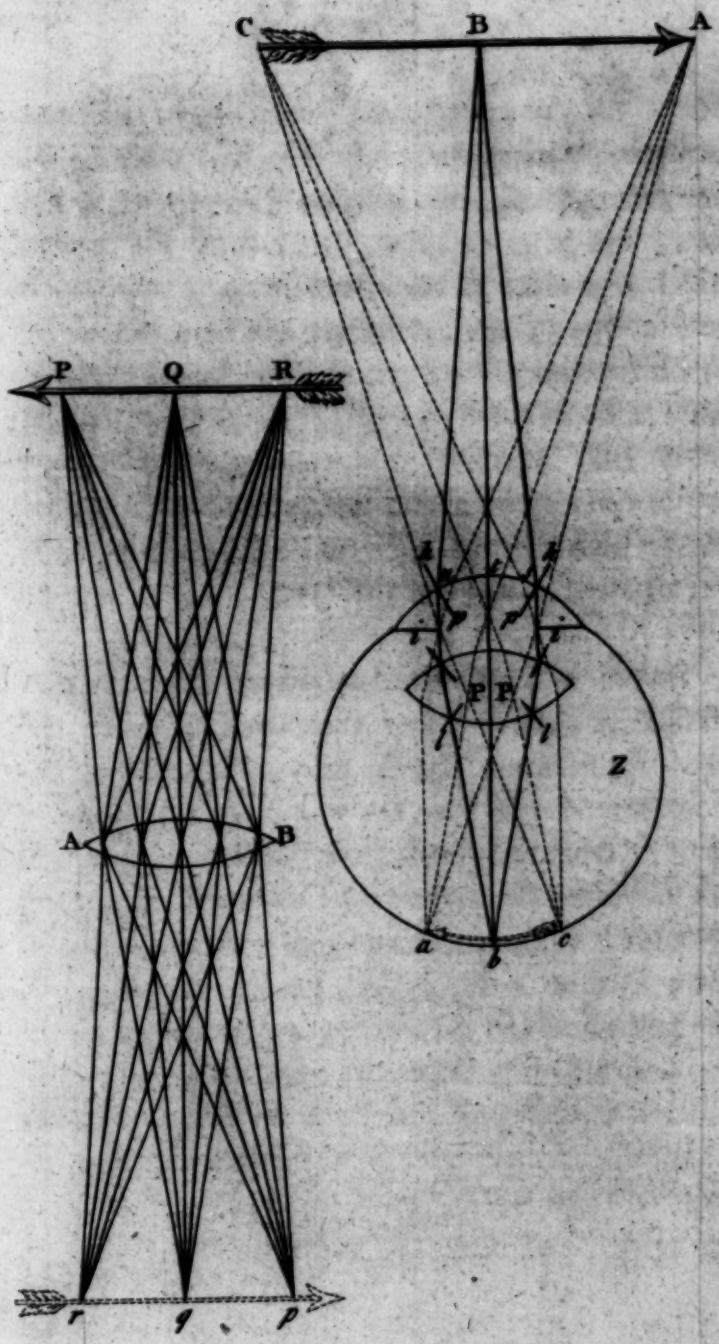


fore ; for the chryſtalline being denſer than the aqueous humor, the rays here alſo muſt be refracted towards the perpendiculars  $i, P, i, P$  ; but theſe perpendiculars, becauſe of the convex circular ſurface of the chryſtalline, do approach one another ; and therefore the rays, which by refraction are turned out of their ſtraight courſe, and made to move towards theſe perpendiculars, muſt alſo approach one another, and become more convergent : and this is the ſecond refraction which the rays ſuffer in moving through the transparent humors of the eye.

But there is yet a third refraction which the rays ſuffer in paſſing out of the chryſtalline into the vitreous humor ; for the chryſtalline humor being more denſe than the vitreous, the light in paſſing from the chryſtalline into this humor, will be refracted from the perpendiculars  $P, I, P, I$ , but becauſe the ſurface of this humor is not convex as that of the other humors, but concave, anſwering to the convex back part of the chryſtalline, which is lodged therein, theſe perpendiculars muſt recede from one another, as in the figure, and conſequently the rays, by being refracted from them, muſt be made yet more to converge, and approach one another.

By







By these refractions, the rays of light which came the point B, are made to converge and meet again in the *retina* at the point *b*; and in like manner the rays that come from all the other points of the object, as from A and C, are made to converge to so many other points in the retina, as *a* and *c*, and by that means an inverted picture of the object will be painted on the *retina*, just as when, by a glass lens placed at a hole in the window shut of a dark room, the inverted images of external objects are cast upon a piece of white paper, placed at a due focal distance behind the lens. And as this is agreeable to reason and geometry, so it is confirmed by experience; for if you take off from the bottom of an eye, newly taken out of the head of any animal, a small portion of the *tunica choroides* and *sclerotica*, and place this eye in a hole made in the window shut of a dark chamber, so as the bottom of the eye may be towards you, you shall then see the pictures or images of external objects lively painted on the *retina*, with their proper figures and colors; only these pictures will be inverted, as has been already noticed.

C H A P. III.  
OF IMPERFECT SIGHTS.

**B**Y the general term of imperfect sight, is meant, a debility of sight, either *absolute* or *relative*, without any opacity of the cornea, or internal parts of the eye.

An obscurity and confusion of sight is said to be relative, when an object cannot be seen in all the usual distances and positions of it, and in a common light, but only in some; thus *myopes*, or short-sighted persons see distant objects confusedly, but those near at hand distinctly, wherefore their sights are imperfect in respect of distant objects.

That sight is *clear*, which is sufficient for the taking in the whole of an object, and distinguishing it from others; that is *obscure*, when insufficient for those purposes.



A *distinct* sight is that which is sufficient for knowing and distinguishing the parts of an object, and the particles of the part; the contrary constitutes a *confused* sight.

An imperfect sight differs from an *amaurosis* or *gutta serena*, as that in the latter, sight is entirely lost, and the pupil becomes immoveable: but, however, if one eye remains sound, the pupil of the blind eye is moved with the pupil of the sound one; but the sound one being shut, the pupil of the diseased one is then entirely destitute of motion. Moreover, in a relatively imperfect sight, the eye sees objects clearly and distinctly under certain circumstances, but in a *gutta serena*, none.

The cause of an imperfect sight is a confusion of the image painted upon the *retina*; now there is a confusion in the image, as often as the little packets of rays, coming from one point of an object are not united upon the same, but in different points of the *retina*; or several packets from different points of an object radiate together upon one point of the image: such is the confusion which takes place in short and long, or old sightedness.

Con-

Confusion also arises from obscurity, as in an absolute imperfect sight; for as no image is distinct unless it is clear, every obscure image is necessarily confused; it is obscure as often as the clearness or quantity of rays is not sufficient, on account of the mistiness of the eyes, or their not having sufficient force upon the *retina*, on account of its diminished sensibility.

---

### S E C T. I.

*A Crepuscular or Twilight Blindness, called by the Greeks, Hemeralopia.*

**I**T is that in which vision in the morning or evening twilight, is dull and confused, in the same place where those, endued with perfect sights, see distinctly.

This disease many years ago, was epidemical in the neighbourhood of Montpellier, more especially in the towns contiguous to a river, and  
among

among the soldiers doing duty as centinels, and exposed to the damps and fogs of the night season.

But as those were cured, in whom by means of purges, vomits, diuretics, blisters, and the like, the superfluous serum was evacuated from the mass of blood, one or two bleedings being premised, it is highly probable, that this species proceeded from a superfluous serum in the mass of blood, which particularly affected and relaxed the organs of sight. It certainly is not difficult to be conceived, that from a humid and cloudy atmosphere, in the autumnal season, the perspirable serum may be retained in the mass of blood, and thus become redundant.

That this relaxing cause acts rather upon the *retina* than on other parts of the eye, the obscurity of sight, consequent upon this relaxation, seems to persuade; for as the obscurity of sight is made in a compound ratio, from the inverse of sensibility, and the inverse of light conjointly, it is evident that, a lesser sensibility of the *retina* being supposed, the obscurity will be little in a strong light, and in a moderate light, as twilight, great; so that the patient may see distinctly enough at noon-day, but on the approach



proach of evening, vision will become very confused and obscure, for the faintness of the light at that time, concurs with the lesser sensibility of the *retina*, to encrease the obscurity of vision.

In this affection the pupil is more dilated than in perfect sights. If there was a total insensibility of the *retina*, its dilatation would be exceedingly great; but as there is only a diminished sensibility of the *retina*, the dilatation of the pupil is encreased about noon day: in the evening when the light is diminished, the pupil is again more dilated; for nature dilates the pupil in that proportion, in which a greater quantity of light is wanted for the purpose of vision: and when the diminution of the light is accompanied with an insensibility of the *retina*, the dilation of the pupil is increased in a degree proportioned to each.

The method of cure is manifest from what has been said; we must endeavour by every help to restore the former tension of the *retina*, and for this end, that the redundant serum in it, may be received back through the absorbent veins, and derived to the strainers of the kidneys, intestines, and skin, and to ulcers  
made



made with blisters behind the ears, a drying diaphoretic diet being used at the same time.

*Boerhaave* enumerates a variety of this disease, which depends upon an immoveable stricture of the pupil, while the retina enjoys its wonted sensibility : in a sound state the aperture of the pupil answers reciprocally to the sensibility of the retina, and therefore it is repugnant for the pupil not to be dilated in the same proportion, in which the intenseness of the light decreases ; but however it may happen that the aperture of the pupil, on account of a singular insensibility of the uvea, may not obey that law. The reason why I relate this, is because, as *Haller* testifies, if the uvea is punctured with a needle, as I have seen in the operation for the cataract, and as he himself performed it in animals, it is not at all moved, from whence we may easily infer, that it is furnished with none or exceedingly few nervous filaments. *Boerhaave* knew no remedy for this disease, more especially if, as is generally the case, this rigidity of the uvea happens to old persons.

## I S E C T.

## S E C T. II.

*A. Meridian Blindness.*

THOSE who are unable to discern objects during the day time, but in the evening and night see tolerably well, are said by *Hippocrates* to be *Nyctalopes* or night sighted. Of this species *Boerhaave* mentions two varieties. The first proceeds from an opaque round spot or partial cataract in the middle of the chrySTALLINE, exactly behind the pupil, but a little less. In this case the pupil will be made to contract during the bright day light to such a degree, as to exclude all rays of light, but those which fall upon the opaque spot in the chrySTALLINE, and therefore no image can be painted on the retina; but in the evening, the pupil dilates, and therefore a sufficient quantity of light will penetrate the limb of the chrySTALLINE, to effect a clear sight. What has been said of a speck in the chrySTALLINE, will also hold, when such a speck is on the cornea.

The second variety is owing to an extream sensibility of the retina, such as happens in an internal opthalmy, while the uvea retains its accustomed moveableness; for just as in an external and violent opthalmy, nature shuts the eyelids so accurately, as that the patient himself,  
even

even with his hand, can scarcely open them, through a fear of the pain, which light brings on; so it is no wonder, if while the retina is excessively sensible; as in an internal opthamly, nothing can determine nature to open the pupil.

The first variety is to be removed by the electrical fluid; or, if that does not succeed, by the couching needle; the second is to be treated in the antiphlogistic manner, as in opthamly's.

---

### S E C T. III.

#### *Myopia or Shortfightedness.*

**MYOPES** or shortfighted persons are those who see confusedly objects at a little distance, but distinctly those which are very near.

Those are very liable to a myopia, who are conversant with minute objects; as goldsmiths, watchmakers, engravers, and miniature painters; in whom the cornea is very convex, or in respect to the globe of the eye, is a part of a much lesser sphere.



The cause of this is an union of the rays of light, behind the chrystalline, before they arrive at the retina; either, First, because the refractive power of the aqueous and chrystalline humor is too great, or secondly, because the cornea and external face of the chrystalline is too convex, or thirdly, because the retina is too remote from the chrystalline, or fourthly, because the object is too distant, or fifthly, because the pupil is too open; or to speak more properly, a myopia is in a compound ratio made up of these conditions, viz. of the refractive power of the aqueous and chrystalline humors, of the distance of the chrystalline and cornea from the retina, of the distance of the objects, and lastly of the aperture of the pupil.

The curative indication is either *palliative* or *radical*; the palliative regards the cause of this disease, the radical the origin. Whatever is the origin, which is more frequently unknown, the cause is an adunation or junction of the rays before they reach the retina. The remedy therefore is to retard that adunation, until the rays do reach the retina. Now experience teaches, and dioptrics demonstrate, that a plano-concave or double concave glass being applied to the eyes, the rays proceeding from distant objects, and therefore mutually parallel to themselves, fall upon the  
eye



eye mutually diverging from one another, and in consequence fall in the same manner, as if they went off from an object near at hand, in which case the focus recedes from the lens; therefore if a glass of a proportionate concavity is used, at a due distance from the eye, the focus of rays proceeding from distant objects, will be extended even to the retina itself, and will not fall short of it as before, and thus a distinct vision will be effected.

Short sighted persons commonly become less so, as they advance in years, and that because the humors of the eye do daily waste and decay; from which decay in the humors, the cornea shrinks, and becomes less convex, and the chrySTALLINE becomes flatter than before, by which means the rays of light will be less refracted, and will not meet so soon behind the chrySTALLINE; and therefore the image on the retina, and the vision caused thereby, will be more perfect and distinct, and the eye will be enabled to see at a greater distance, than when the refraction was stronger in the more plump and convex eyes.

## S E C T.

## S E C T. IV.

*Presbytia. Presbyopia. Long or Old-sightedness*

**I**N this species of sight, near objects are seen confusedly, but remote ones more distinctly.

Thus women who are long-sighted, when they thread a needle, remove the needle and thread to some distance from their eyes; old men also, that they may read more distinctly, remove books beyond the distance of eight inches from their eyes.

The theory of this is easy, from the preceding one; the cause is the too late union of the rays coming from near objects, which is performed beyond the *retina*.

The principles are, First, a lesser convexity of the cornea, and of one or both faces of the chrySTALLINE, so that the curvature of them is a portion of a larger sphere. Secondly, a too great distance of the cornea or chrySTALLINE or both from the *retina*. Thirdly, the refractive power of the pellucid bodies of the eye, less than usual. Fourthly, a too great proximity of objects. Fifthly, a narrowness of the pupil which the Greeks call phtisis.

By

By means of each, and much more by the concurrence of all these principles, it happens that the rays issuing from proximate objects are united too late, and advance the focus beyond the *retina*, from whence there cannot be a distinct vision; for the luminous pyramid is cut off from the *retina* with its rays not yet collected together into the apex of the cone; therefore every point of the object paints a spot on the *retina*, the same as in short sighted persons, with this difference only, that the spot is made by rays not yet united together, and in short sighted persons by rays already united, and again expanded.

Old-sighted persons, in order that they may see distinctly, require a great light: on the contrary myopes or short-sighted persons require but a small light to enable them to read; for the former have a *retina* more rigid from age, a narrower pupil, and objects more remote, all which lessen the clearness of sight: therefore those defects should be compensated by a greater splendor or illumination of an object.

Convex glasses are proper for this species of sight; for, they so refract the rays of light coming from a near point, as to make them fall upon the eye in the same manner, as if they issued from  
from



from a distant point. Therefore, old-sights are most assisted, the more glasses are convex, or whose convexity is a portion of a lesser sphere. They are in some measure relieved by looking through a black tube held before the eye, by the use of which the *retina* grows tenderer, and the rays come in a more parallel direction.

But if, as sometimes happens, a presbyopia arises from a conspicuous fault of the eye, and that recent, then helps may be indicated, towards a radical cure, from the preceding theory.

## S E C T. V.

### *An absolute Dulness of Sight.*

**MYOPES**, Presbytæ and the other imperfect sights above mentioned, in a certain distance or position of the object, see distinctly, and their sight is not confused, unless relatively to other distances, hours and positions; but this species imports an absolute dulness of sight in whatever place, time or situation. Myopes, presbytæ, &c. when they discern acutely, may safely do without glasses, but the absolute dull sight cannot.

It



It seems to depend on a lesser sensibility of the *retina*, such as happens to almost all men after their fiftieth year, and encreases as they grow old; more especially to those who are employed in minute works, who write at night and abuse their eyes. The horopter or boundary of distinct vision in them is shortened from time to time, two or three inches within every ten years; objects attentively considered appear to them confused; the characters of books seem to be doubled, moved and decussated; their eyes being wearied, are every now and then to be rubbed, and shut; objects are removed from the eye as in a presbytia, more especially if the patients shall have undergone the operation for the cataract. The pupil, or to speak more properly the uvea, is scarcely moveable, even when a sudden transion is made from darkness to the light, which is a plain sign of a diminished sense of the *retina*.

In this disease, which the common people attribute to repeated bleedings, women, to a frequent child-bearing, but few to their growing in years, vain remedies, contrary to one another, are proposed by various people; for some oculists praise spiritous resolvents; others extol mere cold water, and contend that the *retina* is still farther dried by spiritous remedies. But the use of glasses all agree to be necessary. Double convex

K

glasses

glasses are the sort proper to be used ; for as by the help of these, the rays being collected, more strongly affect the *retina*, from thence clearness is restored to the sight, and with it distinction, which advantages are alone to be expected from glasses.

The chief rules in choosing glasses are, First, That the glasses be worked to a uniform curvature, pure and well polished. Secondly, That they have a focus suited to the complaint. Those which have a shorter focus, are called *older*, those which have a longer, *younger* ; those which have the longest focus, as four, five, six feet, *preservers* ; but those which have the shortest, as four, three inches, are called *cataracts*.

Those who accustom themselves to older glasses, or those of a shorter focus, are compelled every ten years, by degrees, to use still older, which is very inconvenient, inasmuch as sight is so much the more shortened ; for instance, those who use preservers, for example, of six feet, read best at distances between eight inches and six feet ; but those who use glasses of six inches, cannot distinguish characters placed beyond six inches, unless they are much larger,

From

From hence flows a rule of the greatest moment; namely, that we should at first use the younger glassies, or preservers, and should not pass on to older, unless obliged to it, and by degrees. Those who are not yet accustomed to glassies, ought to try several, and to use, first, those which exhibit objects clear and distinct, but do not sensibly enlarge them, if they are double convex, or diminish them if they are double concave, necessary for myopes. Secondly, Those which do not weary the sight.

Besides glassies, or spectacles which are more convenient, or hand glassies, imperfect sights use to advantage Dutch tubes, commonly called opera glassies, made up of a double convex objective, and a double concave ocular of a lesser diameter; but let the tube be shorter for a myops, and longer for a presbyta; all eyes are equally assisted by these tubes, as they exhibit objects clearer and more distinct.

K 2

SECT.



S E C T. VI.

*Oblique sightedness.*

**T**HIS is, when persons see confusedly objects presented directly before their eyes, but distinctly those which are offered obliquely.

An oblique sight is commonly in practice confounded with a strabismus or squint. But in the latter persons see distinctly, with one eye, an object presented directly before their eyes; whereas in the oblique sight, they incline the face and eye itself to one or other side, from whence they look, that they may see the object more distinctly. A *sight* is called *straight*, when a line extended from an object to the face of the beholder, is perpendicular to the plane joining both pupils, otherwise the sight is *oblique*. When we are about to look at an object, we always turn our face so towards it, as to have a straight or direct view of it; and at the same time we so direct both eyes, that the optical axes may fall upon the middle of the object; but an oblique sighted person, while he looks at an object, which is, for example, to the right, turns his eye and face to the left. A person who squints indeed turns one eye and his face



face to the object which he beholds, but not the other eye, which wanders here and there.

A straight is clearer than an oblique sight, because a greater number of rays enters the pupil: and also a straight sight is more distinct, because the distance and magnitude of an object will be more easily ascertained by rays perpendicular to the uvea, than by oblique ones: add to this, that in a sound state, the optic pole, or that part of the *retina* directly opposite to the pupil, possesses more nervous filaments, and a more exquisite sense than its sides; and lastly, rays falling obliquely upon the pupil, have a focus more diffused in the sides of the *retina*, than those which come strait upon the optic pole.

From thence it is that in reading a book, we run over every word with our eyes: for we see more distinctly those which are offered directly to our eyes, but more confusedly those which are placed obliquely.

An oblique sight happens either, first, Because the pupil is placed obliquely, so as that it may receive more oblique than direct rays. Secondly, Because the convexity of the *cornea* is altered, or its pellucidity, so that more rays are admitted from one or other side, than if they should

should come directly. Or, thirdly, Because the chrySTALLINE is placed obliquely, and its axis is not the same with the axis of the eye. Or, fourthly and lastly, Because the pole is destitute of natural sensibility, from whence we are compelled to direct our sight another way, that we may discern more acutely,

## S E C T. VII.

### *Strabismus or Squinting.*

**I**T is a tonical affection of one or other eye, by which it happens, that the optical axes do not converge with each other for sight.

The optical axes is a straight line, which joins the centers of the vitreous, chrySTALLINE and globe of the eye, and which is thought to be extended even to the object.

It is requisite for vision, that the axes of the right eye should concur at the same point of the object, with the optical axes of the left: from the angle intercepted by these axes, we infer the magnitude

magnitude and distance of objects; therefore if the axes diverge, as in persons who squint, we can judge neither of the distance, nor of the magnitude of objects.

We therefore perceive an object single, altho' looked at with two eyes, because, the eyes converging, the image of the object falls on the optic pole of each eye, and we have been accustomed in these circumstances, to experience a single object to excite that sensation; but when the eyes diverge in an unusual manner, the images of the same object fall upon parts of the eyes not correspondent with one another, and as that double sensation is unusual, we are sensible of it; we do not by turns refer both images to one, but to a double object, from whence a double sight in those who are troubled with a recent squinting, which error is however corrected by use and the intervention of the touch.

The common squint is that in which, on account of a bad custom, of continually directing one eye towards one part, the faculty of converging both optical axes here and there, at pleasure, is lost: thus infants, who, while in their cradles, look at a candle or the window light from one side only, or from having many agreeable objects presented to them at once, which invite  
them



them to turn one eye to one, and the other eye to another, and also those who use themselves to behold a blemish or point upon their nose, acquire a habit of squinting.

Infants newly born move one eye separately from the other, here and there, like cameleons; but afterwards, they by degrees observe objects to be seen more distinctly and clearly with both eyes, and thus learn to direct their optical axes together to the same object, which direction afterwards becomes natural, so that it can scarce be changed by the will.

This species of squint is easily prevented, but when it exists, it is cured by concave conical glasses, pierced only at the apex or tip, or in adults by attention, and reading a small print before a looking glass, and an habitual endeavor to lessen the squint, and bring the optical axes nearer to a parallel direction. We have naturally the power of making small variations in the inclination of the optic axes; and this power may be greatly increased by exercise. If once by an effort of his will, the patient can but lessen his squint, frequent practice will make it easy to lessen it, and will daily increase his power; he may practise before a mirror when alone, and in company



pany he ought to have those about him, who will observe and admonish him when he squints.

Sometimes this want of uniformity in the motions of our eyes, depends on a weakness in one of them; for in this case, as the distance is unequal to which the sight of both eyes extends, we are used to direct the stronger eye to the object, and omit the weaker, because it is useless for the discernment of objects, as often as they are removed to the distance necessary for the other; for example, if the right eye should not see beyond half a foot, and the left beyond a foot, we look at objects only with the left; from whence a squint, which is difficult to be cured. A weakness of the eye is either from the birth, which is incurable, or it depends on a palsy, attack of an epilepsy, &c. the remedies must then be suited to the cure of these diseases.

A squint may be produced from a spasm of any muscle, of one or both eyes, on account of a convulsion having formerly preceded; by which means that muscle becomes immoveable; then the eye is stiffish and resists to the finger, and is constantly turned to the left, to the right, upwards or downwards.

L

If

If one or other of the strait muscles shall have been relaxed and resolved by a palsy, wound, ulcer, or by any cause whatsoever, then the antagonist being convulsed, remains immoveable, as happens to the mouth in a hemiplegia; or the whole eye may be affected with a palsy, and then it remains immoveable and fixed, and does not converge with the sound one; the cure is the same as for the palsy.

There is another species of squint arising from a painful catarrhus congestion, or some other thing of the like nature, in one or other of the muscles, so that the pain prevents that muscle from moving freely. This is easily cured by bleeding, resolvent fomentations, and anodynes; but we must beware of applying narcotics to the eyes, lest a *gutta serena* should be brought on thereby.

A T R E A

A  
T R E A T I S E

ON THE

Diseases of the E Y E.

P A R T II.

THE ATISE

Difficulties of the H. Y. E.



## T R E A T I S E, &amp;c.

## C H A P. I.

*A falling down of the superior Eyelid.*

**I**N this disease, the superior eyelid falls down, so as to overshadow the *cornea*, and as it cannot be lifted up by the action of the elevator muscle, the eye is not at all, or not sufficiently denuded, and so, for the most part, there is no sight, unless the eyelid is continually lifted up by the hand.

This disease happens first, from a mere relaxation of the eyelid, brought on by a superfluous serum; and secondly, from a resolution of the elevator muscle, or a palsy of the eyelid, happening frequently to old people, which is sometimes constant, but sometimes periodical. In this last case, it is observable, the cheek of the  
same

same side is much relaxed, the jaw and tongue are also paralytic, and the eye itself affected in like manner.

In the first case strengthening, spiritous, resolvent fomentations, are prescribed, assisted with cathartics, and other evacnants. The second is to be attacked with antiparalytic remedies, externally and internally. *Baumer* speaks of a cure being wrought by electricity. *Mr. Warner* recommends cold bathing, the Peruvian bark, joined with volatiles, if they should be necessary, astringent topics, and compress and bandage applied to the part in the day time: or the eyelid may be supported by the help of an adhæfive plaster applied upon the forehead and lid. *Platner* says, if strengthening spiritous applications should avail but little, we must try cantharides, by applying a very small plaster of them on the middle of the eyelid. *St. Yves* speaks of the use of fumigations, and has given a receipt for one, and indeed not a bad one. Let rosemary, thyme, and sage, be boiled in wine in a coffee-pot; and when done let a common funnel of a proper size be overwhelmed on the top of the coffee-pot, and the steam be received thro' the nozel on the diseased eye, at such a distance as to be borne without pain. *Plempius* directs, (cuppings, drawers of pituita from the head, and an issue in the

the neck, being premised) a fomentation made from *marjoram*, *chamomile*, and *melilot* flowers, and *cummin*, together with *balauſtines* and *pomegranate rind*. *Cantwell*, in the philosophical transactions, gives a case of a palsey of the eyelids recurring every night, with a discharge of white matter, which was cured in a few days, by having the waters of *Balleruc*, near *Montpelier*, pumped upon the neck and back part of the head. There is an instance recorded in *Mangelus* of a cure of a palsey of the eyelids, effected in a short time, after many other remedies both internal and external had been tried in vain, by the *Ol. Tartar. nigr.* made into a plaster with wax, and applied to the part affected.

I myself am acquainted with the case of a gentleman at Chichester, who laboured under this complaint for some time, which became at length so bad as almost to close his eyelids, and hinder him from going abroad with safety. In this situation he came to London, to seek relief, where he was perfectly restored in about a week, by anointing and gently stroking over the eyelid, and the part above it next the eyebrow, several times in a day, with the following liniment.

R Mari



same side is much relaxed, the jaw and tongue are also paralytic, and the eye itself affected in like manner.

In the first case strengthening, spiritous, resolvent fomentations, are prescribed, assisted with cathartics, and other evacuants. The second is to be attacked with antiparalytic remedies, externally and internally. *Baumer* speaks of a cure being wrought by electricity. *Mr. Warner* recommends cold bathing, the Peruvian bark, joined with volatiles, if they should be necessary, astringent topics, and compress and bandage applied to the part in the day time: or the eyelid may be supported by the help of an adhæsiue plaster applied upon the forehead and lid. *Platner* says, if strengthening spiritous applications should avail but little, we must try cantharides, by applying a very small plaster of them on the middle of the eyelid. *St. Yves* speaks of the use of fumigations, and has given a receipt for one, and indeed not a bad one. Let rosemary, thyme, and sage, be boiled in wine in a coffee-pot; and when done let a common funnel of a proper size be overwhelmed on the top of the coffee-pot, and the steam be received thro' the nozel on the diseased eye, at such a distance as to be borne without pain. *Plempius* directs, (cuppings, derivars of pituita from the head, and an issue in the



the neck, being premised) a fomentation made from *marjoram*, *chamomile*, and *melilot* flowers, and *cumin*, together with *balauksines* and *pomegranate rind*. *Cantwell*, in the philosophical transactions, gives a case of a palsey of the eyelids recurring every night, with a discharge of white matter, which was cured in a few days, by having the waters of *Balleruc*, near *Montpelier*, pumped upon the neck and back part of the head. There is an instance recorded in *Mangelus* of a cure of a palsey of the eyelids, effected in a short time, after many other remedies both internal and external had been tried in vain, by the *Ol. Tartar. nigr.* made into a plaster with wax, and applied to the part affected.

I myself am acquainted with the case of a gentleman at Chichester, who laboured under this complaint for some time, which became at length so bad as almost to close his eyelids, and hinder him from going abroad with safety. In this situation he came to London, to seek relief, where he was perfectly restored in about a week, by anointing and gently stroking over the eyelid, and the part above it next the eyebrow, several times in a day, with the following liniment.

R Mari

*R Mari syriaci ℥iv.*

*Sp. vin. rectif. lbiv. ft. tinctura, Adde*

*Saponis duri lbi.*

*Campbor. ℥iv.*

*Sp. ℥v.*

Two other persons also, afflicted with the same disorder, but in a less degree, received equal benefit from this liniment used in the same manner.

When all other means prove insufficient for the cure, it is recommended, after the example of the antients, to pinch up the skin of the eyelid, in the direction of its folds, and take off a portion of it, afterwards uniting the lips of the wound by suture. The wound being healed, and the skin not being so elongated, says *St. Yves*, the motion of the levator palpebræ will return, and the patient will find himself perfectly cured.

CHAP.

## C H A P. II.

*Lagophthalmos. The Hare's Eye.*

**T**HE Hare's eye is a gaping of the eyelids, produced by a retraction or natural shortness of one or other of them, by which it happens that its motion becomes confined, and does not cover the eye during the time of sleep. The *cornea*, by being thus continually exposed, at first becomes dry, afterwards loses its transparency. This is mentioned by almost all writers as a disease of the superior eyelid, but the accurate, *Heister*, asserts the having seen it, not infrequently, in the lower eyelid also.

It is said to proceed, first, from a defect of matter, and fault of conformation while in the womb. Secondly, from a bad habit, as when infants in their cradles look continually upwards, or backwards. Thirdly, from a dryness brought on by the use of too astringent ophthalmics. Fourthly, From a spasm of the *Elevator palpebrae* and a palsy of the *Orbicularis*. Fifthly, from a cicatrix which remains in consequence of a wound, ulcer, or burn; and this is by much the most frequent cause.

M

When

When this disease proceeds from an original bad conformation, it is incurable. When it is contracted from a custom of looking always behind, or upwards, as the infant lies in the cradle, it must be cured (or rather it should be prevented) by a contrary habit, viz. by wrapping up that part of the cradle next the head with black cloths, and keeping it in the dark, and turning the feet to the light, that by these means the infant may continually look towards the light. When this complaint proceeds from a spasm or palsy, it must be subdued by remedies proper for those diseases, among which electricity promises to be the most powerful. When proceeding from other causes, such remedies as moisten, soften, and relax, are to be used to the part affected. To this end, therefore, as soon as ever the eyelid is perceived to be at all affected with this disease, it should be diligently fomented with the vapor of warm milk or water; or anointed with oil of almonds, or olives; or with mucilage of quince seeds, hare's fat, ointment of marshmallows, or some such like application. At the same time the diseased eyelid, if the superior should be frequently drawn downwards; if the inferior, upwards. Nor will it be amiss, especially at night, to lay plasters, drawing in contrary directions upon each lid, and to assist them by compress and bandage.

and W

M

But



But if these remedies, after having been continued for a long time, should fail of producing the desired effect, we must have recourse to surgery; by means of which we may possibly afford relief, provided too much of the eyelid be not wanting, and there be a sufficient thickness: Therefore having separated the eyelids, let a piece of horn, or sheet lead (besmeared with some kind of grease, and covered with a piece of thin bladder) be introduced within the diseased lid, which is then to be drawn forwards, and an incision made, in the direction of the fibres of the orbicularis muscle, through the external skin and fat. If the affection be but slight, one incision will be sufficient, but if much of the eyelid be wanting, two or three parallel incisions should be made, at a small distance from each other. Care must be taken afterwards, to prevent a fresh coalition of the skin, and also to excite the growth of flesh in the middle of the wound. It will also assist the cure, if narrow slips of plaster be laid on, by means of which the superior eyelid may be drawn downwards, and the inferior upwards. In this manner we are to proceed, until the wound is filled up with new flesh, and the eyelid finds itself sufficiently enlarged, to perform its function properly.

## C H A P. III.

*Ectropium. An Eversion of the Eyelid.*

**T**HE signs of this affection are, a shortness and extraversion or turning outwards of the eyelid, so that the red internal part projects, occasioning a disagreeable appearance; nor is the eye sufficiently covered. This disease may happen to either eyelid, but is more frequently observed in the lower,

The causes assigned for this disease, are various; First, a rough and improper handling of the eyes of the infant by the midwife. Secondly, a laxity of the internal membrane of the eyelid, brought on by too long a use of emollients. Thirdly, a weakness or relaxation of the orbicular muscle, as in old people. Fourthly, fungous flesh sprouting up in ulcers of the internal membrane, or after violent or frequent inflammations of the eye or eyelids, of which *Heister* mentions having seen many and terrible examples, or a tumor in the internal part of the eyelid. Fifthly, a cicatrix succeeding a wound, ulcer, or burn; and this *M. Jan* asserts to be the most frequent cause. Sixthly, a separation of the tarfi, at the great canthus, in the operation for the fistula lachrymalis, or from the succeeding suppuration  
when

when the incision has been made too near the commissure of the eyelids. Seventhly, a marginal dissolution; when by a wound or ulcer the tarsus is divided, from whence the angles of the fissure are retracted, and turned back into a bifid point, either inwards or outwards.

The first species, authors do not mention any cure for. The second we are to endeavour to remedy by a long use of strengtheners, astringents, and desiccants. In the third species, if any relief is to be expected, it must be obtained also by strengthening, drying, spiritous remedies; such as, a dry heat; spiritous focus used in vapor; the clay of warm baths. *Kennedy* mentions rags dipped in warm claret and honey, among the remedies proper to be tried in this case; but he thinks that a machine of lead made on purpose for the diseased eyelid, and worn for some time upon it, would be of the greatest use. *Celsus* advises the application of the actual cautery externally, which should be done with great circumspection, first of all introducing a piece of sheet lead into the eye. With regard to the fourth cause; if a tumor has grown out within the eyelid, it is to be cured by proper topical remedies, or it is to be taken away by caustics, or an artificial excision. If a fungus has arisen, after having  
 appeared

appeased any inflammation there may happen to be, by proper medicaments, it is to be carefully touched every now and then, with the lapis infernalis, taking great care to defend the eye, by anointing it with axunge, or ointment of tutty, and inserting a piece of bladder between the eye and eyelid ; and thus it is to be gradually consumed, until the eyelid restores itself by the spring of its tarsus ; or it may be removed by the knife, previously passing a crooked needle, or a ligature through its base, for the more convenient holding of it, while the extirpation is performing ; or if the base be small, it may be taken off by ligature, which will be more effectually secured from slipping, if it be passed through the fungus. We are to attempt the cure of the fifth species by the same means as were prescribed for the cure of the Hare's Eye proceeding from the same cause. The sixth is irremediable, unless it can be cured by the operation which *Le Dran* relates the having performed successfully, and which consists in taking off a portion of the margin of each eyelid, at the great angle, together with the whole cicatrix, and afterwards uniting them by suture. The seventh is to be remedied, if it be recent, by a proper suture of the conjunctive and skin, leaving the tarsus untouched, and which *St. Yves* recommends to be done in the following



following manner. A crooked and somewhat cutting needle, threaded with a waxed thread, is to be first passed through the two lips of the wound of the internal membrane near the margin of the eyelid, after which the needle is to be withdrawn, but the thread to be left behind, the two ends of which are to be suffered to hang out : a silver needle with a steel point is next to be introduced through the lips of the wound of the external skin, near to the margin of the eyelid also ; this needle is to remain in, upon which several turns in form of a figure of 8 are to be made with the threads which have been left hanging out, observing first, to pass each thread under that extremity of the needle which answers to it, before it is turned. Afterwards a cooling collyrium is to be applied, until the wound is reunited ; then the needle and threads are to be withdrawn. This species of ectropium, when of long standing, admits of no remedy. *M. Jan* thinks it always incurable, however slight or recent the affection may be, because, as he says, the eyelid has not a sufficient thickness to sustain the needle so long a time as is necessary to bring about a reunion.

## C H A P. IV.

*Trichiasis.*

**T**HIS disease is produced by a direction of the eyelashes towards the globe of the eye; occasioning great irritation, which unless seasonably remedied, is followed by excessively acute pains, inflammation, difficulty of seeing, and even blindness itself.

If the long hairs of the eyelids should get between the globe of the eye and the eyelid, they will produce an ophthalmia which will go off upon their extraction; but if the little pores through which these hairs are transmitted, have been ulcerated from any cause, and a cicatrix afterwards brought on, the eyelashes when they come to shoot forth afresh, finding the texture of this place more compact, and harder, will take a different rout, and carrying themselves on the inside, where they find less resistance, will sharply prick, inflame, and ulcerate the eye, until they are extirpated.

It is in vain to cut these hairs, as they only grow again the stiffer for it; they therefore ought to be plucked out, one by one, at distant intervals,

tervals, observing to take them out whole; for if they are broke in the middle, they prick more than while they are intire: and afterwards, to prevent their coming anew, we ought with all due precautions to cauterize the place from whence they have been plucked, with the lapis infernalis. *Heister* speaks of spirit of sal ammoniac, and also highly rectified spirit of wine, as remarkably efficacious for this purpose; for, he says, when the eyelids, after the hairs are extracted, are anointed, by means of a small pencil brush, with these, the little foramina generally soon coalesce, and no new hairs succeed. *Celsus* directs the destroying of the roots of the hairs by the actual cautery. *Ægineta* also says that if the hairs be first plucked out with the forceps, and the actual cautery applied afterwards, the skin will become more compact, and no new hairs will grow out. In either of these operations it will be absolutely necessary to cover with the utmost care the pupil of the eye, either with lint, or a concave thin plate of lead, horn, wax or some other such like material, nearly in the same manner as is wont to be done in artificial eyes, lest it should be endangered from the application of the cautery, or acrid medicaments.

But if these pernicious hairs should have grown out of the whole margin of the eyelid,

N

and

and the patient is either unwilling or unable to bear the extraction, and cauterization *Heister* advises, as the only, though a dreadful, resource, to cut off the margin itself of the eyelid, together with the projecting hairs, lest blindness should ensue; for, he observes, it is better to render the eye deformed, than for the sight entirely to perish. *Cortumius* thinks it better to take off the margin of the eyelid by the lapis infernalis, than with the knife; and he directs it to be done in the following manner. The patient is to be laid on his back, and the eye being defended with some lint, linen, or leather, the external and internal margin of the eyelid is to be well anointed or rubbed with the best lapis infernalis, until the margin, together with the hairs, is eroded. After this is thoroughly done, dry lint is to be applied: in about an hour afterwards linen dipped in rose water and white of egg is to be applied over it, and frequently renewed: the day after, part of the lint is to be taken away lest it should cause inflammation: but as soon as ever a crust is perceived underneath, the whole of the lint is to be removed, and the crust is to be anointed with some mild digestive ointment. In this manner after the sixth or eighth day, as *Cortumius* asserts, the wound will generally be found healed.

There



There is another species of trichiasis, owing to relaxation, and said to arise from a serous humor collecting between the orbicular muscle, and skin covering it, which weakening and distending the external superficies of the eyelid, turns the cartilage itself round, and with it the eyelashes towards the globe of the eye, by which means the inconveniences mentioned in the first species, are induced. When the cartilage is thus inverted, the eyelid is externally bloated up, having a kind of emphysematous appearance. This species is chiefly incident to old people. The remedies proper to be used in this case, are, strengthening, spiritous, resolvent fomentations. *St. Yves* mentions a mixture of a drachm of spirit of salt, with a gallon of spirit of wine, to rub the eyelids with five or six times in a day. He also recommends, when the disease is in the lower eyelid, a small bandage applied so as to press or bear against it, which drawing down the cartilage into its natural situation, affords present relief, and by this means, he says, sometimes the cartilage re-establishes itself entirely, and a perfect cure is effected. *Dionis* proposes the applying two small pieces of leather spread with an adhæsive plaster, one upon the eyelid, and the other upon the forehead, (if the disease be in the superior eyelid) and by means of little threads attached to these

plasters, to tie them together, with such a degree of tightness, as to sustain the eyelid in its natural situation.

If these means should prove ineffectual, it is recommended to take off such a portion of the relaxed skin of the eyelid, following the direction of its folds, as when the lips of the wound are brought together, will restore the cartilage to its natural situation: the lips of the wound are then to be brought in apposition, and retained by three sutures; one in the middle, and one at each end: a compress dipped in common water with a small quantity of spirit of wine in it, is to be laid on the wound, and kept moist for four or five days, at the end of which time, says *St. Yves*, the disease is generally found to be cured.

*Dionis* also enumerates among the causes of this disease, a contraction of the internal membrane of the eyelid, which drawing the tarsus inwards, forces the eyelashes to present their points against the eye. In this case he recommends making a longitudinal incision into the membrane, in order to set it loose, and allow of its elongating itself; by this means he says, the eyelashes will return into their place, and the eye be no more incommoded.

C H A P.

## C H A P. V.

*Ancyloblepharum.*

**T**HE Ancyloblepharum is a concretion of the eyelids with one another, or with the eye itself. It is injurious to vision, and it also impedes the endeavour to direct the sight to any particular object; for when the eyelid adheres to the eye, it destroys its mobility, so that it cannot be turned here and there: this adhesion is more particularly prejudicial to the sight of distant objects, in the seeing of which, the elevation of the superior eyelid greatly contributes; whereas, on the contrary, in the discernment of near objects, the eyelids wink, in order to keep out the greater light, which is reflected from objects near at hand. When the eyelids coalesce with one another, they wink, and the rays of light are either totally or partially intercepted.

This disease is wont to arise whenever from the small-pox, a burn, or any other cause, the eye and its lids have been exulcerated, and proper care has not been taken to prevent the parts from cohering. Children are also, not infrequently born with a union of the eyelids. In this case, if the superior eyelid be drawn upwards,

wards, and the inferior downwards, the tarfi will open, and a fine pellicle, manifestly a continuation of the membrane lining the internal surface of the eyelid will be seen.

There is no other way of curing this disease but by dividing the agglutinated parts, and preventing their reunion afterwards. The surgeon, therefore, should first examine whether the eyelids cohere entirely, or if there is not an aperture left in some part, which there most commonly is, at the greater or internal canthus of the eye next the nose, owing possibly to the tears forcing their way out at this place. If the union of the eyelids be complete, and no opening left, an artificial one must be made, in which ever angle it can most conveniently be done, taking the utmost care not to injure the eye. Into this opening the surgeon is to introduce the blunt end of a probe, and to endeavour by means of that, without using much violence, to separate the eyelids. But if that should be found inadequate to the end designed, a very small pair of scissars, or little curved knife, with a probe point, must be introduced, with which the operator is, with the utmost care and exactness, to divide the eyelids. If the eyelids are not totally conjoined, the making an artificial opening will be unnecessary; but the instruments are to be immediately



ately introduced into the natural opening, and the eyelids are to be divided in the manner abovementioned. If the surgeon should not happen to have an instrument, with a blunt or probe point, at hand, it will not be amiss, lest the eye should be injured, first to introduce a small director, and then carefully divide the eyelids upon that, with a small pair of scissars, knife, or lancet: or the operator may, as *Fabricius ab Aquapendente* recommends, arm the point of a common falcated, or curved knife, with a small oblong button of white wax; and then passing it in at one canthus, carry it on, between the eye and eyelid, to the opposite canthus; where, after feeling on the outside that the button is directed right, the point is to be pushed through, and the eyelids divided.

When the eyelids have been thus separated from each other, the surgeon must next very carefully examine with a probe, whether they adhere also to the eye itself. If they do, he must again free them cautiously with a probe pointed knife, or a blunt lancet, observing rather to wound the white of the eye than the eyelid. But when the whole globe, or the greater part of the eye is firmly attached to the lids, the operation is not only severe, but also extremely hazardous, as it will be very difficult  
to

to disunite the eyelids from the *cornea* without wounding the *cornea*, and injuring, if not wholly destroying the sight.

When the lids have been freed from the globe of the eye, the next business is to prevent them from adhering again, which they most probably will do, if not prevented by interposing some lint, or a very thin plate of lead, wax, or leather, or a piece of gold-beater's skin, cut in the shape of a half-moon and moistened with oil of sweet almonds. Either of these are to be left several days in the eye, until there is no danger of future adhesions. But if the patient cannot bear the interposition of either of these substances, as is sometimes the case, a collyrium, consisting of rose water, tutty, and sugar of lead, must be every now and then dropped into the eye; or the eye must be frequently sprinkled with powder made of sugar, pearls and crab stone; after which, the patient should with his fingers gently rub, elevate, and work about his eyelids. Lastly, the surgeon himself must, every now and then, pass the blunt end of a probe betwixt the lids and the globe of the eye, to free and keep them from adhesions.

*Fabricius*

*Fabricius Hildanus* relates an instance of an adhesion of the superior eyelid to the *conjunctive* and *cornea*, from a wound improperly managed, which he cured by passing, with the help of a bent probe, a silken thread in at one canthus, between the eye and the eyelid, and out at the other canthus, so as to encompass the adhesion: he then fastened the two ends of the silken thread under the eye, and hung to it a piece of lead, of about a drachm weight: this leaden weight was suffered to hang loose in the day-time, but at night was taken off, and the eye covered slightly up with a bandage. By this means, he says, the adhesion was completely divided within eight or nine days, and with scarcely any pain. *Platner* also recommends this method to be tried previous to the use of the knife.

When the eyelids are so glued together by a gummosc or inspissated matter, in the smallpox or inflammations in the eyes, that they cannot easily be opened, they should never be forcibly pulled asunder, but be first moistened a considerable time, with warm milk and water; by which means the patient will generally be able to open the eye himself soon after.

## C H A P. VI.

*Of the various Tubercles or Excrescences observed  
on the Eyelids.*

**T**HE eyelids are liable to various species of preternatural tumors or tubercles, almost all of them of the encysted kind, and are thought to derive their cyst either from an injured and obstructed gland, or from a fatty cell: they are sometimes moveable, sometimes fixed; some have a broad base, others a very slender stem; some give little or no uneasiness, others are very painful, troublesome, and offensive to vision: they differ as to their contents, some holding a substance like a poultice, others like honey, and others suety; but whatever the matter be which they contain, the indication for cure is one and the same in all. The knife is almost always necessary, for they are very difficultly digested into a suppuration. Those especially which are recent, small, moveable and soft, are cured more readily and safely by the knife: however in these, and all, one would not omit to try, first, the milder methods by resolution or suppuration. Those which have a small slender root, may be taken off by ligature, in the compass of a few days:



days : but the most immediate way is the cutting them off with a knife, binding it up, and healing it afterwards, as in other wounds. The means used in attempting to resolve or ripen them are, digesting plasters, such as the Empl. de ammoniaco, galbano, mercuriale, or by the more powerful application of diachylon with the gums, Cataplasma maturans of the London pharmacopœia, or other cataplasms. When matter is formed, the tumor is to be opened, making a sufficiently large incision, to let it out : after this operation, whatever remains must be removed, together with the coat or cyst, by some very powerful digestive medicament, or mild corrodent, such as the red precipitate with alum, the unguent. ægyptiac. &c. for as often as the coat is left behind, and the abscess agglutinated or healed up, the old tumor sprouts up again ; but if neither of these answer the end, it must be extirpated.

The *Hordacolum* takes its name from some imagined resemblance it has with a barley corn ; it is a hard immoveable tumor, having scarcely any sense, of the color of the skin, reddening but rarely, seated sometimes close to the outward skin, but oftener found hid in the interior part of the lid. It differs from other encysted tubercles, as being attended with pain and inflammation, whence grievous pains arise, and an

impeded vision. Suppuration sometimes follows this inflammation.

The first intention of cure is to resolve them, and to alleviate the pain: for this purpose we should at first frequently anoint them with saliva, and after this apply a poultice made of roasted apples, with a little camphire and saffron, in a soft linen cloth. The mucilage plaster is also a good resolvent. If these things prove ineffectual, and by a yellowish hue, they seem tending to suppuration, it would be proper to apply a plaster of meal and honey, or of the diachylon with the gums, or some of the others mentioned above: but if a speedier remedy be desired, recourse must be had to the knife.

The *Grando*, thought to resemble hail, is in reality a *Hordeolum*, but harder, schirrous, and immoveable, growing on the inside of the eyelid, and containing a pellucid body.

*Chalazium* is a certain moveable tubercle in the eyelid.

The *Verruca*, or warts, are not altogether unlike the other tumors mentioned of the eyelids; they are very unsightly, and greatly offensive to vision. They may be extirpated either by ligature,  
or

or by the knife, or by corroding medicaments, such as the spirit of *sal ammoniac*, or *lapis infernalis*. Some apply the blue vitriol stone, or even touch them gently with the oil of vitriol, carefully in all cases guarding the surrounding parts. Actual cauteries are wholly to be avoided; and if they turn black or livid, there is generally danger of a cancer, and therefore it is better to forbear meddling with them.

*Hydatids* are tumors, so called, when like watery bubbles, or little bladders filled with water.

A *Steatoma* is that tumor which contains a fatty, or suetty substance withinside.

An *Atheroma* when its contents are something like a poultice of bread and milk.

A *Meliceris* when a substance like honey is found in the cyst.

When these are small, especially the two last, they are called *stys*; when grown to a large size *wens*; and in removing these by the knife, great regard is to be had to the magnitude and number of their blood vessels before the operation, and afterwards to be ready with all proper

per applications for preventing a great effusion of blood.

---

C H A P. VII.

*A pustulous Excoriation and Ulceration of the Eyelids.*

**T**HIS complaint is known by a sense of weight in, and swelling of, the eyelids, accompanied with sharp pains, continual itching, heat and redness in the angles, and membrana conjunctiva: the tarfi become excoriated and ulcerous, and discharge a glutinous matter, accompanied with corroding tears, and the eyelids are glued together during the night-time: also, small miliary pustules, sometimes callous, like grains of sand, beset the internal surface of the eyelids: the patients complain of sand being got into their eyes and pricking them, and by winking renew and keep up the inflammation, excoriation and ulceration. If the disease continues any length of time, the eyelid, more especially the lower, becomes considerably enlarged, and is inverted, the tarsus projecting like a bow. This disease is stubborn, and very troublesome.

When



When this complaint is recent, the inflammation is to be appeased, chiefly by bleeding, purging and other internal antiphlogistic remedies, and also by external applications.

Take of lily roots half an ounce, melilot or elder flowers one ounce, saffron one scruple; boil them in water; add six grains of sal ammoniac, and a sufficient quantity of flower to make it into a poultice. Let the eye be kept warm with this poultice, wrapped up in linen, and renewed twice a day until the tension goes off from the eyelids, and they become loose and wrinkly, when astringent applications should be made use of, such as a decoction of red roses, pomegranate rind, leaves of agrimony, with a little honey of roses.

When this disease is of long standing, we should anoint the eyelids, morning and evening, with the following ointment.

Take of sugar of lead one drachm, white lead four scruples, camphire six grains; rub them with a little oil of roses, then add an ounce of ointment of tutty: but if the patient cannot bear this ointment, a merely lenient one of fresh butter, sweet oil, and white wax, must be applied.

*St.*

*St. Yves*, in ulcerated and scabby eyelids, makes use of an eyewater, composed of liver of antimony two drachms, tutty half an ounce, camphire half a drachm, cloves twenty grains; all which are to be infused for eight days in eye-bright, fennel, celandine and rue waters, of each four ounces. This water is to be dropped into the eye three times a day, and the ointment of tutty to be applied in the evening. If this does not succeed, *St. Yves* recommends the application of the lapis infernalis to the little ulcers, using proper precautions to avoid injuring the eye.

If there is only a herpes in the eyelids, and no apparent ulcer, it will be sufficient, to make use of, several times in a day, a wash, made of sugar of lead and sal ammoniac, of each four grains, in eight ounces of rose water.

## C H A P. VIII.

*Lippitudo.* An immoderate discharge from the ciliary glands.

**T**HE ciliary glands, in a sound state, separate a small quantity of unctuous fluid, for the purposes of preventing excoriation, which might otherwise happen by the continual striking of one eyelid against the other, and of restraining the efflux and deviation of the tears. But it sometimes happens, from disease, that this sebaceous matter is secreted in too great a quantity, thereby disturbing vision, and gluing the eyelids together during sleep. On waking the eyelids are obliged to be forcibly separated, which is followed by an efflux of serous tears.

It is to be remedied by sprinkling powder of tutty on the part in the evening, or by applying rose water, in eight ounces of which twenty grains of white vitriol have been dissolved, or by other deterfive and moderately astringent remedies.

## C H A P. IX.

*Epiphora. A watery Eye.*

THE character of this is an involuntary efflux of serous tears, without any remarkable itching, pain, or heat: it often follows opthalmies of long duration, and is also occasioned by immoderate study, especially in persons arrived at the age of fifty, when the sight is diminished, and objects, unless at a small distance, cannot be discerned: as the winter comes on, it grows worse, and is difficultly cured: in the mean time, if the patient abstains from study, wind, smoak, salt foods and wine, and at the same time foment his eye at night, with an infusion of four cloves in two ounces of brandy, this affection will be lessened. But if the patient for so slight an inconvenience, is inclined to make use of cathartics, and blisters to the neck, as authors advise, he may probably meet with more relief. There is another species of epiphora, accompanied with heat, itching, redness and pain of the eye; but this is never found otherwise than as a symptomatic affection.

C H A P.



## C H A P. X.

*Cancer of the Eyelids.*

**T**HIS discharge is distinguished by a hard and shooting tumor, often exulcerated, of the eyelids. *St. Yves* has observed five varieties of this disease.

In the first variety, a hard tumor grows to the superior eyelid, with blood vessels at its base, turgid, and of a lead color, and at intervals attended with lancing pains.

In the second, a wart adheres to the inner angle of the eye, below the commissure of the eyelids: its roots are deep, and it is covered with blood vessels divided into granulated packets, which bleed upon the slightest pressure: this tumor itches so excessively, that the patient can hardly refrain from scratching it, from whence a cancerous ulcer quickly branches forth.

In the third, the blood vessels are varicous, and of a lead color, without any antecedent wart or tumor: but in these three varieties, in process of time, an exulceration comes on, with fungous

flesh, which afterwards wasting away of its own accord, the ulcer is left to diffuse itself more and more over the other parts of the face.

The fourth begins with an epiphora, or acrid tears, exulcerating the lachrymal caruncle, and afterwards corroding the inferior eyelid, whose margins from thence become callous. Sometimes a fistula lachrymalis precedes this disease.

The fifth is not unfrequently occasioned by a blow upon the eye, by which the vessels are contused, and the blood, before vitiated by a cancerous acrimony, is altered, and thus a cancerous and callous ulcer soon follows.

All these varieties, except the second, admit not of a *radical* cure : but the *palliative* cure requires a milk diet, cooling, diluent regimen, warm fomentations, and acidulated waters. Amongst a number of external applications, frogs spawn water, garden night-shade water, or some simple distilled water, with a few grains of sugar of lead dissolved in it, have obtained credit.

## C H A P. XI.

*Encanthis.*

**A**N Encanthis is a fleshy tubercle arising in the greater angle of the eye, and is seated either upon the *caruncula lachrymalis*, or the *valvula semilunaris*. This tumor sometimes increases to such a degree, as not only to cover the puncta lachrymalia, but also the greatest part of the pupil. When this is the case, the tears flow continually over the cheeks, the eyes are inflamed, the face is remarkably disfigured, and vision itself greatly impeded.

There are two species of encanthis: one of which is milder, and unaccompanied with pain or hardness; and another, more obstinate and malignant, and which is attended with pain and lividness, and has in some sort a cancerous aspect.

In the milder species of encanthis, frequent scarifications, and mild escharotics, are generally of great service in the beginning. *Heister* recommends as the best and mildest corrosive, a powder consisting of canary sugar, four parts, and white vitriol, one part, or burnt alum, a fifth

fifth part. This powder is to be sprinkled gently and cautiously, every now and then, upon the tumor; and a little while after, the eye should be washed clean with warm water. The tumor is to be thus sprinkled, until it is entirely destroyed. If we gain but little ground by this, the lapis infernalis may be used now and then, but with the utmost caution.

If these medicaments should avail nothing towards the reduction of the fungous flesh, we must have recourse to excision; in which case the excrescence should be laid hold of with a hook, or transfixed with a silken thread, by the intervention of a needle, that the extirpation may be accomplished with a knife or scissars. The greatest care is here necessary, to avoid injuring the eye itself, or the caruncula lachrymalis. As the lachrymal caruncule preserves a cavity for the reception of the tears, which would otherwise flow out upon the cheeks, the consequence of injuring that, would be a weeping eye ever after. It is better therefore to leave a portion behind, and remove it afterwards by corrosives, or the knife, than run the risque of taking away too much.

When the encanthis is of the more obstinate sort, and already tending to a cancer, it is better



to omit the operation, and the use of corodents, lest they should exasperate it, and only make use of drying, cooling, and lenient collyria, or ointments.

Fleshy tubercles or excrescences, not altogether unlike the encanthis, sometimes grow out from the internal surface of the eyelid: they are very small in their beginning, but gradually increase, and sometimes attain to a considerable size. They are destroyed either by the lapis infernalis, or the knife, treating the wound afterwards with a collyrium of aloes, tutty, and sugar of lead in rose water.

---

## C H A P. XII.

*Unguis, Pterygium, or Pannus. Nail or Web of the Eye.*

THE *Unguis*, or *Pterygium*, as it is called by the Greeks, is a thin, whitish, membranous excrescence, growing out most commonly from one of the angles of the eye, and frequently extending itself so far over the cornea and pupil as to obstruct the sight. It is sometimes full of reddish

dish turgid veins, appearing to be nothing else but a congeries of blood vessels; and then it is usually called *pannus*, or *panniculus*. It generally arises from the nasal or greater canthus of the eye, being a production of the membrana semilunaris; sometimes from the lesser canthus; and now and then, though very seldom, from one or other of the eyelids. Sometimes it adheres only slightly, by means of a few slender fibrils, to the cornea; and at other times it covers the whole eye, and coheres strongly with it, which renders the cure extremely difficult.

If there should be any inflammation of the eye, we should endeavour to subdue that, before we proceed any further, by bleeding, purging, blistering, and other applications effectual to this purpose. When the unguis or pannus is recent, and as yet but thin and soft, it may sometimes be dissolved by mild cathartics: a drachm of canary sugar, and four or six grains of white vitriol, or burnt alum, or even verdigrease mixed together and finely powdered, is an excellent medicament for this purpose, says *Heister*, if very cautiously sprinkled now and then upon the mischievous membrane, either with the fingers, or by means of a quill. *Heister* also recommends viper's fat, the gaul of the lamprey, fresh butter with a small quantity of white vitriol in it, or  
half

half a scruple of white vitriol dissolved in two ounces of the greater celandine water; particularly for infants, to whom it is very difficult to apply a powder. *St. Yves* recommends a solution of the lapis divinus\*, or lapis medicamentosus, in common water.

If these means prove inadequate to the cure, recourse must be had to excision; in order to which the surgeon must pass a small hook underneath that part of the unguis which is the least adherent to the eye, and elevate it a little; after which he is to pass a needle and ligature through the unguis, and make a double knot upon it; then joining the ends of the thread in form of a loop, he is gently to raise the unguis up; which being done, he must, with a lancet, so divide the superior and inferior part of the membrane, covering the unguis, as that introducing a strait and small pair of scizzars underneath, he may have it in his power to cut it off, as expeditiously as possible, close to the caruncula lachrymalis; he is then to draw back the ligature with the membrane towards the cornea, and if the unguis adheres any where to the eye, he is to free it, by degrees, with a lancet or scissars.

\* The lapis divinus is composed of equal parts of alum, nitre, and blue vitriol, melted together in a glazed earthen vessel, afterwards adding a little camphor.

In the performance of this operation, three things are chiefly to be regarded: first, in dividing of the membrane close to the caruncula lachrymalis, to be particularly careful not to remove any part, much less the whole, of the caruncle; for if this body, which serves to stop and direct the lachrymal fluid into the puncta lachrymalia, be wanting, the patient will be troubled with a watry eye ever after: secondly, to avoid wounding the eye: thirdly, to leave no part of the unguis behind, from which the disease might be reproduced: nevertheless it is better to leave a little of the unguis remaining behind, when strongly cohering with the cornea, than from too solicitous an attention to the complete detachment of it, to run the risque of wounding the cornea, from which incurable scars might ensue.

*St. Yves* advises the application of brandy and water to the eye, for the first four days after the operation; and afterwards, for the cicatrising of the wound, a solution of the lapis divinus in common water. If any of the unguis should have been left behind, it must be treated with mild corrosives, such as are above-mentioned,

These



These little membranes may sometimes be removed by a simple division of their vessels near to the carunūcula lachrymalis ; especially when they appear full of red, large bloodvessels, running from the greater angle to the cornea ; for being thus deprived of their nutriment, they gradually decay, or at least are more easily removed by medicaments.

Sometimes the cornea is incruſted over with a glutinous kind of matter like fat, or a little membrane, which may be readily taken off with the gaul of an eel, lamprey, or some other gall of the same nature.

Sometimes also these membranes are hard, unequal, blackish, turned back, and accompanied with violent pains communicating with the temples ; in this case, as they are of a cancerous nature, no operation should be performed, or irritating topics made use of : all that can be done is to palliate by means of cooling, anodyne collyria, alterative medicines, and a proper regimen with regard to diet.

When the unguis covers the whole eye, *St. Yves* advises us to divide it into four parts, and operate upon each part singly, in the manner abovementioned.

## C H A P. XIII.

*Fistula Lachrymalis.*

WE have seen, p. 15, 16, 17, and 18, that the lachrymal fluid, after answering the purposes of its secretion, is transmitted to the great canthus of the eye, from thence through the *puncta lachrymalia*, by two little canals, into the *lachrymal sac*, and from thence through the *ductus ad nares* into the nose. Now this is what happens in a natural and undiseased state: but if from any cause an obstruction takes place, so that the tears cannot pass freely from the sac into the nose, they will of course accumulate in the sac, and dilate it; part will either spontaneously, or upon pressure, regurgitate through the *puncta*, and the disorder commonly called a *fistula lachrymalis* will be produced.

There are various causes which may prevent the transmission of the tears through the lachrymal passages: thus sometimes an inspissated humor lodges in and blocks them up, or a polypus which fills the whole nostril, opposes itself

to the discharge from the duct. But the most common source of this disease, is an inflammation and swelling of the membrane lining the sac and duct, happening frequently after the small-pox and ophthalmies, by which means the passage becomes compressed and straightened, and the flow of tears through it thereby restrained. *Platner* observes also, that those who have flat and depressed nostrils are more obnoxious to this disorder.

We may know that the passage is obstructed from some cause or other, by a dilatation and external swelling of the sac, arising from the detention and accumulation of its contents; a humor mixed\* with mucus is discharged through the puncta lachrymalia into the eye, which is perpetually watery. This discharge is made more frequently if the patient coughs or sneezes, and may likewise be forced out, by pressing a little forcibly with the finger on the outside of the sac, at which time the tumor subsides. If the disease has proceeded no farther, it is unaccompanied with pain, discoloration of the skin, or any other inconvenience, than what results from the discharge through the puncta, and the trickling of the lymph down the cheeks. This distension and resolution of the lachrymal sac, is  
by

by some called a *lachrymal bernia*; *Anell* gives it the name of *dropsy* of the *lachrymal sac*.

In this state of the disease the remedies are, the injection of some thin, mild fluid, through one of the puncta into the sac, by means of *Anell's* syringe\*, pressure to be occasionally made by one of the fingers on the sac, in order to evacuate its contents, and a moderately cooling and

\* *Monf. Anell* also invented a fine silver probe not thicker than a hog's bristle, to be introduced, previous to the use of the syringe, through one of the puncta, sac, and duct, into the nose, in order to remove and dissipate any obstruction that it might meet with in its passage. He relates the history of many cures which he has performed with these instruments, and he assures us, that this method is sufficient for the cure of all the diseases of the lachrymal passages. But it is objected to the probe, that its small size, necessary flexibility, and very little resistance it is capable of making, render it unequal to the task assigned, and that the quick sensation of the parts, and their diseased state, make the attempt improper and mischievous. See *Pott* on fistul. lachrym. p. 34, 34. *Heister* is lavish in his commendations of *Anell's* method, and asserts the having cured numbers by it, and he thinks there is hardly any fistula lachrymalis so obstinate, that will not yield to this method, provided it be not accompanied with caries or callus; nay, he even mentions one instance, where there was a slight caries, which was cured by a perseverance in this method. “ *Intera nulla*  
“ *sepe tam pertinax lachrymalis fistula deprehenditur, quin ex-*  
“ *ist, ari*



and astringent collyrium occasionally used ; not neglecting, if there should be occasion, the use

“ *tirpari per hætenus explicata Anelii artificia possit : dum-*  
 “ *do caries atque callus absuerint. Quin agomet non sæpiissime*  
 “ *tantum fistulas ejusmodi quam minimo temporis spatio, hoc est,*  
 “ *intra tres quatuor se dies felicitur istac ratione curavi ; sed*  
 “ *singulari quoque experimento didici, posse vel ad ipsas etiam*  
 “ *caries mitiores Anelianam istam methodum band prorsus*  
 “ *aniter adhiberi. Sic enim, anno 1727, puellam quandam,*  
 “ *undecim annos habentem, per sex circiter menses continuato*  
 “ *quotidie injectionis opere, felicitur ab ejusmodi fistula veteri*  
 “ *et carie mitiori donata, me liberare memini ; quæ nunc ad-*  
 “ *huc bene valet et matrimonium iniit.*” Heister, p. 580.

But he acknowledges, that a thorough knowledge of the parts, a sharp and clear eyesight, together with a steady and dextrous hand, are particularly requisite for those who use Anell's instruments, and that they will succeed difficultly with those who are not possessed of those requisites.

Platner, after recommending the probe and syringe as a cure for an incipient fistula lachrymalis, has these words : “ *Hanc curandi rationem, quam plures contemnunt,*  
 “ *experiri in his casibus decet, cum ea raro, et vix, nisi minus*  
 “ *peritos atque parum exercitatos, fallat. Nec tam acerbos*  
 “ *dolores excitat, si provide et ea adhibita diligentia specillum*  
 “ *dimittitur, ne id isinera, per que fertur convulneret. Si*  
 “ *etiam quandoque res minus succedit, id quod in hominibus*  
 “ *nasum finum ac valde depressum habentibus, evenire potest*  
 “ *eam nulla pericula circumstant. Nec tamen hanc curationem*  
 “ *experiri convenit, si corpus ægrum ac mali habitus est, et*  
 “ *nisi prius opthalmia, oxæna, aliusve morbus, ex quo hoc vi-*  
 “ *tium enatum fuit, omnis fuit remotus.*” Platner Chirurg.

of

of cathartics, bleeding, blisters, and other useful medicaments, that the habit of the patient, and the different circumstances of the case may require, together with a careful regimen of life and diet.

By these means we are told, that the disorder may be partly, if not wholly subdued, so as that the patient will be able to live for a length of time, if not always, without having recourse to a more troublesome and painful process. But if these remedies should prove insufficient, we must proceed as in the next stage of the disorder.

Sometimes an inflammation supervenes, in which case there is an evident increase of the tumor, accompanied with heat, redness, pain and tension, and a fluid of a purulent appearance is discharged through the puncta: if no relief is had, the inflammation and swelling increase, and at last, the integuments being incapable of any farther distension, burst, and a puriform discharge emerges through the aperture: the tumor then subsides, the patient becomes easy from the stretch of the parts being taken off, and the discharge which used to issue through the puncta, now flows through the new aperture.

In

In this case, it becomes necessary for the lachrymal sac to be laid open, and if we are called in time enough, it should be performed before the bursting of the integuments: the incision is to be made with a small round pointed knife, and is to be carried from the upper part of the tumor to the lower, quite down into the cavity of the sac, taking care not to divide the juncture of the eye-lids; the wound is then to be dilated either with dry lint, or a bit of prepared sponge, in order to ascertain the state of the sac and duct; and if these should be found diseased, we are to dress the wound superficially, make use of moderate pressure externally, and suffer the sore to heal up, that by these means the integuments may contract, and the sac become lessened.

If this simple method does not succeed, or from the state of the parts seems unlikely to do so, Mr. Pott tells us another must be tried, by which we are to aim at rendering the nasal duct pervious to the lachrymal fluid: to obtain this end he says we are to endeavor very gradually to dilate the lachrymal duct; by passing either a probe, or a piece of catgut, or a bougie gently into it, as far as it will easily go, and repeating it occasionally until it is got quite  
R through,

through, and the passage is free. When a passage has been once obtained, he directs us to keep it carefully open, either by a piece of catgut, a small bougie, a leaden probe, or something of that sort; and when it is thoroughly established, he says the fore may be permitted to contract, until it becomes no more than what serves for the introduction of the bougie into the duct; in this state he thinks it should be kept open for some time, injecting now and then a little aqua calcis, softened with mel rosar. through from above into the nose; and when it appears, that the passage is so free, and so well established, that there is good probability of its preserving itself, he directs us to dress the wound superficially, make use of moderate pressure on the sac, and suffer the wound to close up.

But if this method does not succeed, or the bones should be carious, the only resource we have left, is the forming of a new and artificial passage for the lachrymal fluid to be conveyed through from the sac to the nostril, by the perforation of the os unguis; this may be performed with a strong probe, gimblet, drill, perforator of a trepan, curved trocar, or any other instrument, which like an awl, has a sharp point of

a mo,



a moderate thickness, and will perforate the os unguis without widely breaking or shivering it.

The instrument is to be carried in a certain direction, lest it should arrive at the anterior process of the maxillary bone, or the plain part of the os ethmoides. It is also to be so inclined, as that it may be driven obliquely downwards, inwards, and backwards, as there is danger of its injuring the septum nasi, and spongy bones of the nostrils. If the instrument is carried directly downwards, it may get into the maxillary sinus. The bone is known to be pierced if a little blood distills from the nostril.

After the perforation is made, if there should be any sharp splinters broke off, they should be immediately taken out, and the wound cleansed with rags and a sponge. Also, when a perfect passage to the nostril is thus obtained, we must take care to preserve it, as the growing flesh and callus are wont, unless they are repressed, to fill it up in a short time. There are various methods of treatment for this purpose: some pass a pipe of gold, silver, or lead, into the new-made aperture, that it may rest upon the bone; others introduce a tent, a small bougie, or piece of

through, and the passage is free. When a passage has been once obtained, he directs us to keep it carefully open, either by a piece of catgut, a small bougie, a leaden probe, or something of that sort; and when it is thoroughly established, he says the fore may be permitted to contract, until it becomes no more than what serves for the introduction of the bougie into the duct; in this state he thinks it should be kept open for some time, injecting now and then a little aqua calcis, softened with mel rosar. through from above into the nose; and when it appears, that the passage is so free, and so well established, that there is good probability of its preserving itself, he directs us to dress the wound superficially, make use of moderate pressure on the sac, and suffer the wound to close up.

But if this method does not succeed, or the bones should be carious, the only resource we have left, is the forming of a new and artificial passage for the lachrymal fluid to be conveyed through from the sac to the nostril, by the perforation of the os unguis; this may be performed with a strong probe, gimblet, drill, perforator of a trepan, curved trocar, or any other instrument, which like an awl, has a sharp point of

a mo,

a moderate thickness, and will perforate the os unguis without widely breaking or shivering it.

The instrument is to be carried in a certain direction, lest it should arrive at the anterior process of the maxillary bone, or the plain part of the os ethmoides. It is also to be so inclined, as that it may be driven obliquely downwards, inwards, and backwards, as there is danger of its injuring the septum nasi, and spongy bones of the nostrils. If the instrument is carried directly downwards, it may get into the maxillary sinus. The bone is known to be pierced if a little blood distills from the nostril.

After the perforation is made, if there should be any sharp splinters broke off, they should be immediately taken out, and the wound cleansed with rags and a sponge. Also, when a perfect passage to the nostril is thus obtained, we must take care to preserve it, as the growing flesh and callus are wont, unless they are repressed, to fill it up in a short time. There are various methods of treatment for this purpose: some pass a pipe of gold, silver, or lead, into the new-made aperture, that it may rest upon the bone; others introduce a tent, a small bougie, or piece of

wood of a conical form, and suffer it to remain until the edges of the aperture in the bone are become callous all around. If a golden, silver, or leaden pipe, is passed in, the sore may be digested and healed over it; and *Heister* says, that when a pipe is thus left in, it creates so little uneasiness to the patient, that some have not known he had left any thing in. He also advises, a day after the edges of the wound have been brought together, the injection of dec. veronicæ through one of the puncta with *Anell's* syringe, and repeated several times a day, that thus a way may be shewn for the tears through the tube. But when a small bit of wood or bougie is made use of, the wound is to be kept open until the edges of the foramen are become thoroughly callous. If an inflammation is excited in the eye, the most effectual remedies should be used to subdue it.

Mr. *Pott's* directions for the treatment, after the making this new passage, are as follow:  
 “ As soon as the perforation is made, a tent of  
 “ lint should be introduced of such size as to fill  
 “ the aperture, and so long as to pass through  
 “ it into the cavity of the nose; this should be  
 “ permitted to remain in two three, or four  
 “ days, until the suppuration of the parts ren-  
 “ ders



" ders its extraction easy, and after that a  
 " fresh one should be passed every day, until  
 " the clean granulating appearance of the sore  
 " makes it probable, that the edges of the  
 " divided membrane are in the same state: the  
 " business now is to prevent the incarnation  
 " from closing the orifice, for which purpose  
 " the end of the tent may be moistened with  
 " spir. vitriol. ten. or a piece of lunar cau-  
 " stic so included in a quill, as to leave little  
 " more than the extremity naked, may at each  
 " dressing, or every other, or every third day  
 " be introduced, by which the granulation will  
 " be repressed, and the opening maintained; and  
 " when this has been done for some little time,  
 " a piece of bougie of proper size, or a leaden  
 " canula may be introduced instead of the tent,  
 " and leaving off all other dressing, the sore  
 " may be suffered to contract as much as the  
 " bougie will permit, which should be of such  
 " length, that one extremity of it may lie level  
 " with the skin in the corner of the eye, and the  
 " other be within the nose."

" The longer time the patient can be pre-  
 " vailed upon to wear the bougie, the more  
 " likely will be the continuance of the opening;  
 " and when it is withdrawn, the external orifice  
 " should

“ should be covered only by a superficial  
 “ pledget, or plaster, and suffered to heal under  
 “ moderate pressure.”

The puncta lachrymalia require a particular animadversion. They appear to have a very small cartilaginous ring, by which means they are always open, and receive the humor. These puncta are covered by a very tender membrane, which sometimes, if no humor distils to these passages, is dried, and the puncta are blinded. This happens more frequently to glass-makers, who form glass into various shapes by a furnace, and to others who burn and boil metals of different kinds, by a very strong fire. For all the humor accustomed to distil through those passages is evaporated by the fire, so that there is danger, lest from these puncta being shut up, the eyes should be watery ever after. However, there is a cure mentioned for this disease: an opening is to be made into the lachrymal sac, and a small blunt probe with a round head is to be first introduced, but afterwards another with a sharp point, which is to be pushed upwards, and towards these puncta, until it goes out through the puncta. The passage being again set free, is to be kept open by frequently passing the blunt probe through it.

CHAP.

## C H A P. XIV.

## O P H T H A L M Y.

*Of the Ophthalmia in general.*

**I**T is known by pain, redness and weeping of the eye, together with an impatience and inability to bear the light.

Pain in the eyes is in proportion to the sensibility of this organ, which is very great; for no part of equal bulk receives so many nervous filaments as the eye. Its filaments are derived from six pair of nerves, and sensibility is in proportion to the quantity of nerves within a given space, supposing the stretch of the nervous threads to be equal.

The pain is accompanied with redness, heat, tension, swelling; which are all produced by a preternatural influx of blood into the vessels of the eye.

The

The inability of bearing the light, infers an increased sensibility of the retina, whether it is owing to an inflammatory fullness of it, or the choroid, and its uveous expansion being too much on the stretch, or whether the sclerotic also contributes : in all these cases, there is a *myosis* or contraction of the pupil, according to the degree of this uneasiness, produced by the rays of light.

The abundant flux of tears is owing to the irritation produced by the pain, dryness and heat of the eye, nature intending that secretion, to wash away any extraneous body that may chance to be there, to moisten what is dry, and to attenuate what is hot and acrid. From hence it may be understood why the tears are secreted faster than they can be reabsorbed by the lachrymal points, and therefore flow down over the cheeks,

*The spurious Ophthalmia.*

This species is the slightest of all, having no internal pre-existent fault for its cause, and takes its rise from some accidental and external circumstance, as smoke, wind, dust, immoderate reading, labour of the eyes in the examination of minute objects, the steam of onions, garlic, &c.

It



It is cured by the assistance either of nature or art: nature, for instance, washes out the dust or acrid particle by means of the tears; appeases the pain arising from the light, by shutting the eyelids in the day time. The medical art, in imitation of nature, spreads a shade of green silk, dictates the exclusion of light and wind, calls for warm water to wash the eye with, and forbids any attempt to read or work, especially at night. If any thing should stick in the eyes, or between the eyelid and the eye, it should be extracted, by opening the eyelids and introducing a feather, bit of paper, the end of a probe armed with fine lint, a small hog's bristle turned and bent into the form of a loop, or the corner of a silk handkerchief.

*The dry Ophthalmia:*

In this species there is no tumor in the eyelids, but a redness and itching only in the tarfi; there are scarcely any tears, the eyelids are glued together in the night time, and light reflected from water is scarcely to be borne. It is cured more easily than the moist ophthalmia; nevertheless it is sometimes obstinate and habitual, in which case it is cherished by the acrimony of the humors.

The cure requires bleeding, which is frequently sufficient; but what succeeds best of all is, after the use of cathartics, warm bathing, repeated for some days; and on coming out of the bath, some cooling apozem or sweet whey is to be administered. At night, anodynes are of service, especially to children, as *Sydenham* observes. And in the summer the chalybeat waters should be drank for several days.

The external applications proper to be used, are washes made of simple distilled waters, with a small quantity of brandy, or of sugar of lead, or white vitriol. *St. Yves* prescribes a wash made with rose and plantain waters, of each two ounces, tutty, twelve grains, and a spoonful of spirit of wine: with this the eye is to be fomented during the day, but at night a compress, dipped in a decoction of the leaves of speedwell, thyme and roses, made in red wine, is to be applied: slices of a pear or apple frequently renewed, are very useful in mitigating the pain.

*The moist Ophthalmy.*

This as well as the dry ophthalmy is frequently habitual, or has its source in the mass of blood, from which circumstance it is difficult  
of

of cure. It is known by the abundance of tears, swelling of the eyelids about the tarfi, increased secretion of the sebaceous humor from the ciliary glands, lancinating pains in the eye, insufferance of light, redness of the eye, with an impossibility of separating the eyelids: from thence follow spots, and sometimes ulcers on the cornea. Frequently, in children, the cheeks are excoriated by the tears, and the nose and lips, on account of the prone and inclined situation of the head, become swelled.

The remedies consist of bleeding from the arm, foot and neck, and also three or four leeches applied contiguous to the eye. A common purge, consisting of senna, manna and tamarinds, is to be given. Antiphlogistic diluents are to be used. At night a paregoric should be taken. A large blister should also be applied between the shoulders; or a seton or issue cut; or in children we should excite a discharge from the ears, and keep it running, to make a revulsion of the acrid serum from the eyes. Purging is also to be repeated, and then warm bathing may be used, unless the state of the tongue and stomach should forbid it.

In the mean time the mildest applications, such as the pulp of an apple boiled in milk,

milk itself newly drawn, mucilage of fleabane or quince seeds, the white of an egg mixed with rose water, or what is better, because it does not glue up the eyes, the white of an egg thickened by a little powdered alum, and wrapped up in a linen cloth, the white of an egg boiled hard, and cut in half, and then sprinkled with rose water, and also rose water with a little sugar of lead, are to be used. The pain being appeased, the quantity of a very small pea of some mild ointment, should be introduced at night, between the eyelids, by which means the gluing together of them by the discharge, will be in a great measure prevented.

If when the flux of water has ceased, there should remain any ulcer upon the cornea, it must be treated as directed under the head of ulcers of the cornea.

Lastly, when this ophthalmy becomes inveterate, the white or roman vitriol ought to be dissolved in clear water, in such a proportion, that when a drop is poured into the eye, it may excite a vivid but momentary pain: thus a scruple of vitriol in six ounces of water, with a drachm of sugar, causes this effect: this wash should be dropped in when going to bed, nor is the eye to be burthened with bandage or compress.



compress. In the morning the eye should be bathed with warm simple or rose water.

There are some who add three grains of verdigrease to the vitriol, or make use of wine in which copper money has been infused for a night, or who infuse the lapis divinus in water, and pour some drops of it into the eye in the evening, all which collyria have a happy effect, provided the humor has been corrected by proper remedies.

*The Chemosis Ophthalmy.*

The chemosis ophthalmy arises either from an external cause, as a violent contusion of the eye, from whence an echymosis; a chirurgical operation performed upon the eye, as the operation for the cataract, unguis, &c. or else it has an internal cause, as a translation or critical deposition, or a violent cold in bad habits.

The character of this ophthalmy is, a blackish red, swelling of the conjunctiva, which rises equal to a finger's breadth, with a depression and obscurity of the cornea, which seems to lay hid in a pit. The inflammation is very great, with dreadful pains of the eye and head, sense of weight

weight over the orbit, watchings, fever, throbbing, swelling and closure of the eyelids. It is terminated sometimes by a suppuration of the eye, from whence an incurable blindness: at least it is followed by a lencoma or speck on the cornea.

This disease is to the eye, what the pleurisy is to the chest, and the blood in the porringer is covered with a coriaceous or leather like crust, the same as in an inflammation of the pleura\*.

Nothing is more efficacious in the beginning, than repeated bleedings from the arm, foot and neck, and sometimes a few leeches applied to the eyelids themselves: some even advise scarifications of the eye. Cathartics, consisting of an infusion of two drachms of fenna leaves, one drachm of rhubarb, and an ounce of manna, or even a stronger of scammony, &c. may be

\* *St. Yves* mentions a case of a lady in a pleurisy, who not being bled, was attacked with this species of ophthalmia, upon which her pleurisy ceased, but the fever continuing, with an inflammation of the eye, the suppuration quickly came on. The other was attacked in twenty days after with the same accidents, and with as much violence, but had a happier event, a lencoma only being left behind.

given

given with considerable advantage. A blister should also be applied between the shoulders, and glysters occasionally administered. Diacodium or laudanum should be given at night, in order to procure sleep. The diet should be cooling, diluting, light and easy of digestion.

In the mean while, the eye, at the beginning, should be fomented with warm milk, chickens blood, or a weak decoction of white poppy heads and mallow flowers. The common poultices are to be avoided, as they offend by their weight and pressure; but the application of the warm pulp of an apple boiled in milk, may be used with advantage. Afterwards, if the swelling of the eyelids and tunica conjunctiva subsides, and the lividness and diminution of pain indicate it, resolvent applications, as wine, brandy, or even camphorated spirits, diluted with rose water, are to be used.

If there are signs of suppuration, the assistance of a surgeon will be necessary to evacuate the matter, and heal the wound: but if a synchysis or effusion of the vitreous humor should supervene, an artificial eye must be placed in the room of the natural one, that at least deformity may be avoided.

*The*

*The pustulous Opthalmy.*

In this species, little packets of red vessels run from the internal coat of the eyelid even to the cornea, on the edge of which a small pustule arises: but if the pustule be seated on the cornea itself, matter forming there, will be discovered by its whiteness.

The cure consists in the application of a solution of the lapis divinus in water, to the pustules: but if matter has formed on the cornea, the abscess should be opened with the point of a lancet, and afterwards touched with the same solution.

*The Eryspelatous Ophthalmy.*

In this, besides a redness of the conjunctive, tumor of the eyelids, with intolerable pains of the eye and head, and with very great heat, scabby incrustations, and branny scales break out in the forehead, temples, and nose, which when healed, leave scars behind. This disease is stubborn and difficult of cure.

The treatment of this requires first, a fomentation of elder flower water, with a tenth part spirit



spirit of wine; secondly, after repeated bleeding and purging, a seton cut in the nape of the neck, and also blisters applied between the shoulder-blades, or behind the ears. If the pains continue violent, bleeding is to be repeated, and narcotics are to be made use of.

*The Scrophulous Ophthalmia.*

This is common to scrophulous children, and is frequently of the moist kind. The margins of the eyelids are swelled, and generally covered with a glutinous humor; the conjunctive is red, and somewhat swelled; and the tears are acrid. The little patients hang their heads downwards; the nose, lips, and neck are puffed up, and somewhat swelled; and the cornea is very frequently rendered opake by a white spot.

The source of this disease is a scrophulous, viscid and acrid humor, which it is necessary to correct, by proper diluents, and if possible to evacuate. This to be attempted by mercurial purges, frequently repeated at proper intervals. At the same time, aperient liquors, in which

T

mille-

millepedes and steel filings have been infused, are to be used as common drink. The expressed juice of clivers in the quantity of one, two, three, or more ounces, according to the age of the patient, may also be given in a morning, two or three times a week, in the intervals of the purging medicines. A good diet drink may be made by boiling a few ounces of dock roots, in ten pints of water, till reduced to five, adding four or five handfuls of cypress tops, at the end. In some cases, instead of mercurial purges, ten, twenty or more grains, according to the age of the patient, of æthiops mineral may be given every morning, interposing a purge every third or fourth day. Sea bathing, at proper seasons, will generally be attended with very great advantage. But above all, whenever the disease appears obstinate, a seton should be immediately made in the neck, and kept open for a considerable length of time.

With respect to topical applications, Sir *Hans Sloane's* remedy appears well suited to this disease: it is an ointment prepared with vipers fat and tutty, with which the margins of the eyelids are to be besmeared night and morning, at the same time applying a large blister to the neck,

neck; especially if no seton has been previously made. When the inflammation is abated, resolvent washes may also be used.

### *The Venereal Ophthalmia.*

This may be divided into two varieties, viz. The *translative* and *symptomatic*: both depend upon the venereal virus, and grow worse towards night.

The symptomatic remits towards morning, never turns into a chemosis, the morbid matter does not change place, the pains are milder, it is removed when the lues is cured, and is also attended with less danger.

The translative ophthalmia does not remit towards morning, terminates always in a chemosis, the morbid matter changes place, the pains are more violent, it remains after the lues is cured, and is more dangerous.

The increase of pain, heat, and redness when in bed, the resistance to the common, and yielding to antivenereal remedies, are to be attributed to the venereal poison. It is very like

the moist and chemosis ophthalmies, with this exception, that in the venereal, the conjunctive is as it were fleshy and hardish.

The translativè ophthalmy, begins with a copious discharge of sebaceous humor, of a yellowish white colour, and is known by the tumor, lividness, sharp and launcing pain of the sclerotica, the cornea, at the same time, being as it were depressed within a pit. It frequently follows soon after an injudicious stoppage of a gonorrhœa, the venereal virus being translated into the eye. It has also been observed, that a gonorrhœa, which before seemed incurable, has, upon the coming on of this ophthalmy, suddenly vanished; and in like manner the ophthalmy has gone off, upon the return of the gonorrhœa.

Sometimes a venereal ophthalmy has been produced by the immediate application of the virus to the eyes. *Van Swieten* relates the history of a young man, who having been used to wash his eyes every morning with his urine, in order to strengthen his eyes, continued the same custom after he had contracted a gonorrhœa; in consequence of which, a severe venereal ophthalmy quickly ensued. If from any circum-



cumstance, the venereal virus gets upon the finger, and the eye should soon after be rubbed with that finger, before the hands have been washed, it might also probably produce this species of ophthalmy. A surgeon of *Montpellier* laying down upon a pillow sprinkled with venereal saliva, contracted this disease.

The venereal ophthalmy in general is subdued, and its poison extinguished by mercury; but it should never be applied to the eyes. The patient should be bled and purged, and his eye washed continually with brandy and water, or a mixture of *Goulard's* extract, with one hundred times the quantity of water. It is necessary also to evacuate the virulent matter, collected in the cellular texture of the sclerotica and eyelids, by slight incisions of each membrane: an ichor, very like that of a gonorrhæa, will be discharged,

---

## C H A P. XV.

*Phlyctenæ, or Vesications of the Cornea, and Conjunctive.*

THESE are little superficial bladders of water, like those which are produced from a scald,  
or

or burn, arising on the cornea, or membrana conjunctiva : they are usually about the size of a millet seed, but have been known to equal a filberd nut ; and, when produced by a sharp, corroding humor (as is most frequently the case) are accompanied with violent, darting pains. Upon taking a side view of these little bladders, they will be seen perfectly transparent ; but if looked at in front, they will appear of the color of that part of the eye in which they happen to be seated.

These vesications may be produced by any hot and acrid humor falling upon the eye, and thus they frequently appear in the small pox, and measles. They are also excited by external causes, such as the heat of the sun, lighted substances, hot, sharp, and corrosive liquors, insects, or any other foreign body, capable by its carimony of raising a blister, getting into the eye.

They terminate either by resolution, which is best, or by bursting withinside, or by an external ulcer, which sometimes widely corrodes the cornea. That the resolution may be obtained, we are to make use of the general remedies for ophthalmies, such as bleeding, a light thin diet, emollient fomentations, and purges. A decoction

tion of elder flowers and linseed, may be used as a fomentation: the pustule subsiding, or the inflammation being abated, the resolution should be attempted by the use of a collyrium, consisting of rose-water, two ounces and a half, brandy one drachm, tutty and opium, of each a scruple, white vitriol two grains; or an infusion of red rose-leaves, with a small quantity of white vitriol.

The white, and even the yellow of an egg, mixed with sugar and saffron, and fomentations of melilot, vervain, rue, and red rose decoctions are also proper to be used.

If notwithstanding the use of these remedies, the pustules still remain, they should be pierced with the point of a lancet; the fluid being then discharged, the ulcer is to be cured by such means as are directed for the cure of ulcers of the cornea. Some indeed are for puncturing the vesications on their first appearance, without attempting to resolve them.

## C H A P. XVI.

*Abscesses of the Cornea.*

**T**HESE are collections of matter, seated either between the lamellæ of the cornea transparent, or between the conjunctiva and cornea opaca. They are generally the consequence of a chemosis ophthalmi, and are accompanied with great head-ach, watching, weight over the orbit, fever, throbbing and dimness of sight.

When the matter is lodged under the first, or outward lamella of the cornea, there appears a roundish, white, eminent spot, but when it is situated in the middle of the substance of the cornea, the tumor is flat and depressed; and when the complaint originates near the internal lamella of the cornea, there is frequently no tumor externally, the swelling being altogether within side. When the abscess is formed between the sclerotica, and conjunctiva, the swelling is the only symptom, besides the general ones of pain and inflammation, to point it out.

As soon as ever the existence of matter is well ascertained, a puncture should be made in the  
most



most prominent part of the tumor, with either a lancet or a couching needle, and the matter discharged. When the cornea has been thus punctured, *Heister* recommends vipers fat to be dropped in, by which means, he says, the wound will be cleansed and closed up, and the sight sometimes restored. But he however acknowledges, that when the matter lies deep in the cornea, the loss of sight is almost unavoidable.

---

## C H A P. XVII.

### *Ulcers of the Cornea and Conjunctive.*

**T**HE eye, as well as every other part of the body, is liable from various causes to become ulcerated; and according to the different circumstances and conditions of these ulcers authors have thought fit to bestow different names on them: thus when the ulcer was hollow and narrow, they called it *Botbryon* when it was broader, but more superficial, they

U

gave

gave it the appellation of *Caloma* ; when it described a portion of a circle, they termed it *Argemon* ; when it was foul, and covered with a crust *Epicauma* or *Encauma*.

These ulcers are usually accompanied with an ophthalmy, impatience of light, cloudiness of sight and sensation of sand or grits in the eye. The appearance of an ulcer in the cornea, and an ulcer in the conjunctive is somewhat different ; the former resembling a whitish point or spot, the latter having a reddish appearance.

The causes of this complaint are not only pustules, abscesses, wounds and all solutions of the continuity of these parts, in general ; but also all acrid and corrosive humors, which falling upon the glands of the eye, and on the eyelids, run and lodge upon the eye.

The first thing to be done for the cure of this disorder, is, if possible, to remove the inflammation, and dissipate the flux of humors which occasion it. This point we are to endeavor to gain by bleeding, purging, pediluvia, blisters, diet, sweetners of the blood, and such other remedies as are mentioned in the chapter on ophthalmies.

thalmies. Also if any turgid blood-vessel be seen running upon the eye, and communicating with an ulcer, it should be carefully divided with the point of a small knife or lancet.

When the inflammation is gone off, and the eyes begin to dry up, the ulcers frequently get well of their own accord. It will greatly assist them however, says Mr. *Platner*, if *Woolhouse's* ointment be applied to the eye. This consists of *Ærug Æris pp*, mixed up with fresh butter or soft axunge\*.

If however the ulcers should still remain uncicatrized, we must make use of a solution of the lapis divinus of St. *Roes* in water, or an ointment made of white wax and fresh butter, with a little red precipitate in it, or mel rosarum, with a little mel ægytiacum added to it, or some other detergent medicament.

\* *Platner's* method of applying any ointment to the eye, is by inclosing it in a piece of bladder, the open extremity of which is to be made fast by a ligature : after that he perforates the bladder at its lower part, and then carrying it close to the eye, he squeezes out the ointment through the hole or perforation into the eye.

When the disease is obstinate, St. Yves recommends an infusion of cloves, aloes, crocus metallorum and comphor in Spanish wine ; a few drops of this, he says, being dropped into the eye three or four times in a day, will cicatrize the ulcers.

---

## C H A P. XVIII.

### *Spots, Specks, and Opacities of the Cornea,*

THESE are, most frequently, the consequences of either inflammations, abscesses, or ulcers ; and according to their depth, extent, and situation in regard to the pupil, are more or less injurious to vision. Authors have divided this disease into two species ; one, where the spot is thin and superficial, which they call *Nebula* ; the other, where it is thick and deep, which they name *Albugo*, and the Greeks *Leucoma* : this last is seldom curable.

If



If there should be any ophthalmy, accompanying an opacity of the cornea, that must be first subdued. The remedies made use of, for the removal of the spot are mild caustics, and discutients, such as vitriol, the juice of celandine, the gaul of fishes (particularly the Eel and the Pike) or birds of prey, vipers fat and crocus metallorum. *Platner* recommends a mixture of honey and ants, which has been baked, either by the heat of the sun or in an oven. Whatever of this kind is applied, must be made so weak as not to excite any inflammation. If the complaint should not give way, and any turgid vein be seen going from the conjunctive to the spot, we should make no scruple of cautiously dividing it, with a small knife, lancet, or scizzars. *Boerhaave* recommends also the repeated use of mercurial purgatives, to dissolve the lymph, and by that means free the cornea from the spot.

*Woolhouse*, in an albugo, accompanied with much moisture, advises repeated suffumigations of aloes, myrrh, mastich, and juniper-berries, sprinkled on live coals, the warm smoak being conveyed to the eye through a funnel.

*Mauchart*

*Mauchart* advises the vapors of hyssop, chervil, greater celandine, mother of thyme, marjoram, rosemary, juniper-berries, coffee, valerian root, mastich, camphor, boiled in wine, water, or lime water ; or let the eye be immersed in an ophthalmic bath, consisting of a decoction of these.

*Dr. Mead* recommends a collyrium, composed of equal parts of common glass and white sugar-candy, reduced to a very fine powder by trituration and lœvigation ; a little of this powder being blown through a quill into the eye every day, by its incisive quality, he says, gradually absterges and abrades the spot.

The opacity may sometimes, when it is very superficial, be pared off, with a very fine sharp knife.

---

## C H A P   X I X .

### *Staphyloma.*

**T**HERE are two species of this disease : the first is a preternatural dilatation and elevation of  
of

of the cornea transparens, and sometimes of the sclerotica, produced, according to St. Yves, by a corrosion or exulceration of some of the lamellæ of the cornea, whence being rendered weaker in that part, it gives way to the pressure of the aqueous humor, and so projects externally: the second is a tumor springing out from the cornea, caused by the protrusion of the uvea through an aperture in the cornea, whether produced by a wound or other external or internal cause. There are several varieties of this disease, taking different names, according to the different figure and magnitude of the tumor: thus when it was thought to resemble a grape, authors have given it the generic name of *staphyloma*; when it bore a similitude to the head of a fly, *myocephalum*; when like a nail, *elos*, or *clavus*, when resembling a berry, *melon*; if like a pearl, *margarita*.

This disease produces not only deformity and blindness, but also frequently dreadful inflammations of the eyes, likewise pains of the head, sleeplessness, and suppurations, and thus not infrequently excites a cancer itself; so that every method of cure, for the most part, regards not so much the restoration and preservation of the sight, for that almost always perishes,

as

as the seasonable remedying of the deformity, and subsequent evils abovementioned.

Whatever relates to the cure, must be suited to the figure, causes, and importance of the complaint. As soon as ever therefore any preternatural tumor of the cornea, or sclerotica is perceived, we ought immediately to apply a compress dipped in alum water, a leaden plate, and bandage, or even some compressing instrument contrived for the purpose, that, by the help of these, the tumor may be repressed. But if the uvea is found fallen through an aperture of the cornea, whilst the complaint is recent, it should be immediately and dextrously returned by means of a small probe; if the opening is too small to admit of a return of the uvea, it must be enlarged with a small curved knife: the patient should be kept in a supine posture, and proper remedies made use of. By these means sight is sometimes happily restored.

But if the complaint is inveterate, or does not yield to remedies, we must proceed to an operation for the removal of it. This the ancients used to accomplish by passing a needle, with a double thread through the middle of the tumor, and then taking the two ends of one thread



thread they tied it above, and did the same with the others below, so tight as that the tumor should gradually decay, and at last fall off. But this method being generally found to produce no slight pains, inflammations, and suppurations in the eye, *Heister* advises, as the safest and most expeditious remedy, to cut off the tumor.

*St. Yves* advises, when the tumor does not occupy the whole cornea, to pass a crooked needle, threaded with silk through the middle of the staphyloma, and then taking away the needle, and twisting the two filken threads a little, to lay hold of them with the fingers of the left hand, and afterwards by means of a knife or lancet, to loosen the tumor a little beneath the thread, until we are able to thoroughly extirpate it by the scissars: afterwards he orders spirits of wine, diluted with water, to be laid on the diseased eye. For thus, not only the staphyloma is removed, but the cornea also, is either entirely healed up, or only a very small hole remains in the middle of the wound, through which the aqueous humor flows indeed in that proportion, in which it is secreted within the eye, but however with hardly any inconvenience to the patient,

X

for

for it is gently carried with the tears by the lachrymal passages to the nostrils.

But when the staphyloma possesses the whole cornea, *Heister* advises the method of cure prescribed by *St. Ives*, as the most expedient, in which not only the cornea itself, but also the uvea with about a line's breadth of the conjunctive is cut off. For then the humors are discharged from the eye, the eye is contracted into a lesser form, and the wound itself is closed; which being done an artificial eye is inserted, which ought not only to resemble the other eye, but also to be exactly adapted to the afflicted part, by which means it will be moved here and there by the muscles of the eye, in such manner as not to be distinguished from the true and sound eye.

---

## C H A P. XX.

### *Hypopion.*

**I**T sometimes happens that a purulent matter is found behind the cornea, in the place proper for the reception of the aqueous humor.  
This

This affection is denominated by most physicians of this time, *Hypopium*, also *Pyefis*. It is attended in the beginning with severe pains of the eye and head : and, if not relieved, a supuration of the inside of the eye, blindness, or even death itself, according to the degree of injury, gradually ensue.

It takes its rise from an inward effusion of blood, or formation of matter, after some violent inflammation, the small pox, the operation for the cataract, or any very severe external injury of the eye.

If the quantity of blood or matter be small, the first and mildest step to be taken, is to try the effect of resolvents ; such as fomentations made of sage, eyebright hyssop, and fennel-seed boiled in red wine ; the patient should also be bled in the jugular vein, and his body kept open. By these means, Mr. *Heister* says, he has known the eye, when dangerously affected, restored to its former vigor. If these remedies should be found to avail any thing in the removal of the complaint, they should be persisted in, until all the blood or matter is dissipated : but if they should prove

X 2

ineffectual,

ineffectual, and the pain, and other evils attendant upon this disease should encrease, it will be necessary, in order to prevent the destruction of the eye, to cautiously open the cornea below the pupil, and about a line's breadth distant from the white of the eye, with the point of a lancet: if the noxious humor does not then flow out sufficiently of itself, the eye is to be gently compressed and stroaked with the fingers, or, as *St. Ives* advises, some warm water may be injected through the opening with a small syringe, which will wash and carry out the offending matter along with it.

After all the heterogeneous is discharged, compresses dipped in a collyrium made of rose or plantain water, and white of egg, or mucilage of quince seeds, with or without camphor, are to be applied, and kept constantly moist. In this manner, not only the wound in the cornea is quickly healed, but also the aqueous humor and sight, unless the internal parts of the eye be much hurt, are sometimes restored.

If some days after the evacuation of the matter there should be a fresh extravasation, which very frequently happens, the wound  
must



must be forced open with a very small probe, and the matter discharged as at first.

There is another method of cure said to be made use of formerly by *Justus*, a celebrated oculist in the time of *Galen*. His method was, to place the patient in a seat opposite to him : he then took hold of his head with both hands, which he strongly shook and agitated, until the adventitious fluid entirely disappeared ; and what is remarkable, it is related by *Galen*, that the bystanders could very clearly perceive the offending matter, to gradually subside. *Heister* observes, that although some reject this method of cure as idle and ridiculous, yet he looks upon it as a very powerful remedy ; and this not only from the authority of *Galen*, but from his own experience in the case of one, who being under his care for the cure of this disorder, had occasion to go a journey in a carriage, in the performance of which, he was remarkably shook and agitated ; and in one day after his return, the purulent matter was intirely dischuffed. He therefore thinks it proper to try this means, previous to the performance of a chyrurgical operation.

## C H A P. XXI.

*A Closure or filling up of the Pupil.*

**T**HERE are two species of this disease: one where the pupil is totally constricted or shut, and the lips of the uvea coalesce; and this most frequently happens either from the birth, or after some violent inflammation of the eye: the second, where the pupil is filled up by a cataract which adheres to the whole circumference of the iris.

The cure, if any, consists in an operation invented by Mr. *Chefelden*, the manner of performing which, Mr. *Sharp* describes as follows. The patient must be placed as for couching, and the eye kept open and fixed by the *speculum oculi*, which is absolutely necessary here, since the flaccidity of the membrane from the issue of the aqueous humor, would take away its proper resistance to the knife, and make it, instead of being cut through, tear from the *ligamentum ciliare*: then introducing the knife \* in the same

\* The knife invented for this operation is somewhat like a couching needle, but cutting only on one side. See *Sharp*. Plate 10.

part of the *conjunctiva* you wound in couching, insinuate it with its blade held horizontally, and the back of it towards you, between the *ligamentum ciliare* and circumference of the *iris*, into the anterior chamber of the eye, and after it is advanced to the farther side of it, make your incision quite through the membrane; and if the operation succeeds, it will upon wounding fly open, and appear a large orifice, though not so wide as it becomes afterwards.

The place to be opened in the *iris* will be according to the nature of the disease: if the membrane itself be only affected with a contraction, the middle part of it, which is the natural situation of the pupil, must be cut; but if there be a cataract, the incision must be made above or below the cataract, though I think it more eligible to do it above. Mr. *Sharp*\* however adds, that the event of this operation is upon the whole very doubtful; and Mr. *Warner* says, he has never yet seen a single instance of success from it, and therefore cannot recommend it, as an adviseable operation, under any circumstance whatever. †

\* *Sharp*. p. 167, 8.

† *Warner*, on the eye, p. 84.

## C H A P. XXII.

*An Inflammation of the Choroid.*

**T**HIS is manifested by an inability to bear the light, a constriction of the pupil, weeping, and sometimes a redness of the conjunctiva : to these are added obstinate pains occupying half the head on that side where the disease is.

The cure is the same, as of the chemosis ophthalmy.

## C H A P. XXIII.

*A Cataract.*

**A** Cataract is defined to be an abolition of sight, attended with a conspicuous opacity behind the pupil, which losing its natural black colour, becomes opaque, and contracts colours foreign to it, such as white, grey, yellow, blue or ferrugineous. In this case the *chrystalline lens*, or its coverings, viz. either the *arachnoid coat*



coat in which it is enclosed, or the *vitreous*, with which the bed of the vitreous humor, in which the lens is seated, is invested, which naturally ought to be transparent, being rendered opake, reflects all the rays of light, but transmits scarcely any; therefore, no image of objects can be painted on the *retina*, and the sight thereof must be suppressed, by means of this obstacle, although the retina and the other organs of sight are in the best state possible.\*

The

\* We must not omit what *Heister* says, viz. that although the true, ordinary and most frequent cause of a cataract, is an opacity or obscurity of the chrystalline humor, yet that he is far from denying, but that it sometimes, though rarely, is occasioned by a preternatural membrane, or pellicle in the aqueous humor, of which he produces several instances; one of his own observation, another from *Lancisi*, and others from other authors. *Palsin* reports, that since the dispute on this subject, between *Woolhouse* and *Heister*, many instances of the kind have been found, by different persons, in human subjects: he enumerates above twenty, amongst which he reckons three by *Winslow*, three by *Lancisi*, and six by *Geister*. *Morgagni* also cites *Mauchart* and *Zeller*, as having seen in each eye of a woman, a thin and blackish pellicle, placed before the pupil firmly adhering to the cornea, near its internal circumference. Doctor *Mead* indeed adduces one instance (as a proof that a membranous cataract may exist) of a membranous tegument, spread over the pupil of an infant, which was injected,

Y

and

The eye begins to be dim from a nascent and recent cataract, so that the patient seems to perceive, as it were, a little cloud before it; this appears, from time to time, sometimes faster, at others more slowly, to grow thicker, and, at length, opposes itself so manifestly to the interior powers of sight, as to be outwardly discernible to every one who looks at it. As the disease advances, the sight becomes more and more dull, and at length is wholly lost.

The same thing happens in a recent cataract, as to those who look at objects through a very convex lens, viz. they only see distinctly, things near at hand, and placed at a determined distance; or the sight is shortened from time to time. As the opacity of the spot, which at first represented a mist or cloud placed in the bottom of the eye, increases by degrees, and tends gradually to a whiteness, it will appear to the oculist, on looking at it, to come nearer the cornea, or to be less deeply situated, as the same object seems to be placed nearer, because it re-

and shewn to him by Doctor *Laurence*; but *Morgagni* has set this matter to rights, by observing, that it was nothing more than the *membrana pupillaris*, which not being sufficiently known at that time, was taken for a preternatural and diseased appearance.

flects

reflects more light ; for the more that spot reflects the light, the less it transmits to the retina ; therefore the sight becomes gradually more obscure in the cataract ; and when the opacity ceases to increase, the cataract is said to be mature or ripe ; at which time the patients can indeed distinguish the solar light, but not the colours and figures of bodies.

There are also persons afflicted with cataracts, who, on account of a conjunct fault of the retina, are, in the beginning, teased with a suffusion, or apparent vision of flies, or threads suspended in the air : but this suffusion does by no means constantly accompany a cataract, nor ought it to be placed amongst its signs ; and they err, who suppose such like appearances are to be deduced from imagined streaks or opaque points in the chrystalline, whom *De Chales*, in his optics, justly derides : cataractous persons, possessing a faultless retina, see objects involved, as it were, in an uniform mist ; but they see no distinct objects, or such as are circumscribed within certain limits fluttering in the air.

If the lens alone becomes opaque, and is contracted, but the arachnoid coat be entire and

pellucid, the person, in the beginning, sees those which are placed on one side of him, better than those fronting him. He sees also better at night and in the dark, in which the pupil is widened, than in the day time, and in a great light. But when the arachnoid coat is vitiated, it may be known, by examining into the first origin of it, and into the disease which brought it on; for it generally arises from inflammation, by which, though discussed, the sight grows dull and dim much sooner, so that in a short time all vision is lost. In this kind of cataract, no sensation of light is left, nor can the person see better in the dark, although the pupil be dilated. The cataract itself, which is beheld within, is whitish, and as it were wrinkled.

The most frequent cause of a cataract, is a violent inflammation of the eye, arising either from some internal cause, or external violence, such as a fall, blow or burn. Many have brought on themselves a cataract, by frequent inspection of the sun or looking at a fire. *Fabricius Hildanus* relates a case of a cataract arising in one night's time from an incessant weeping for some days before.

The



The methods recommended for the relief of persons suffering under this disease, may be considered as either *physical* or *chirurgical*. With regard to the former, Dr. *Buchan* says, that in a recent or beginning cataract, the same medicines are to be used as in a gutta serena, and that they will sometimes succeed. He also affirms, that he has himself resolved a recent cataract, by giving the patient frequent purges with calomel, keeping a poultice of fresh hemlock constantly upon the eye, and a perpetual blister upon the neck. *Platner* strongly recommends the juice of live millepedes. *Sauvage* extols the white henbane as a specific in this case \*.

\* Usus extracti hyoscyami albi quotidianus, a triente grano incipiendo, & sensim augendo, quamdiu, nulla est œsophagi nariumve siccitas, est egregium & ferme unicum remedium quod cataractam resolvat, ut pluribus observationibus comperit habeo. Presbyter ea affectus in oculo dextro, post octo dies quibus hoc medicamine usus est, quo intervallo, ad tria grana pervenit, jam minutos librorum characteres legere valet, qui prius non nisi maximos perspiciebat; chrySTALLINUS, prius albus, jam subcæruleus evasit & subpellucidus, suffusio myodes qua laborabat evanuit, fames autem & somnus, prius languentes, vigent maxime. Ab hoc medicamine alium vidimus a D. *Coulas* etiam curatum, cujus chrySTALLINUS omnino diaphanus evasit. *Sauvage* Tom. p. 724.

*Cabalibert*

*Cbalibert* asserts, that an infant cataract is susceptible of being remedied by an aromatic spirituous composition, the strength of which must be proportioned to the degree of the malady. *Boerhaave* also recommends, as the best topical application, the vapor of some mild spirit conveyed to the eye. But what bids the fairest for success, is the electric fluid conveyed in a stream to the eye, which certainly proves more powerfully discutient, than any other application whatever.

The chirurgical helps consist of two operations. In one of them, a needle is introduced into the eye, behind the uvea, and the diseased chrystalline pressed downwards, and hid in the bottom part of the vitreous humor; this is called the operation by Couching or Depression. In the other mode of operating the cornea is incised, and the cataract taken quite out of the eye; and this is called the operation by Extraction.

But before we proceed to any operation for the removal of the cataract, it will be necessary to inform ourselves of the following particulars, viz. whether there be any opacity of the cornea or considerable adhesion of the uvea to the diseased chrystalline,

talline, or whether the patient be unable to distinguish light from darkness, as either of these circumstances would be a sufficient objection to the operation. The method of ascertaining an adhesion of the uvea to the cataract, is to shut the patient's eye, and rub the lids a little ; then opening it suddenly, you will perceive the pupil contract, if the chrystalline humor does not prevent its action, by its adhesion. The operation would also be unadvisable, if the eye is wasted, or grown larger than it naturally was. Cataracts are of various colors, and though those of other colors frequently succeed very happily, yet the pearl coloured, and those of the color of burnished iron, are reckoned to endure the needle best. Cataracts that ensue from external injuries, as blows, wounds, or punctures, are frequently irremediable, as the other parts of the eye are often too much injured to afford any prospect of success from the removal of the cataract. With regard to children, it is better to wait till they arrive at a reasonable age, as they are not sufficiently obedient or tranquil for the performance of the operation. In like manner as to adults ; those who are troubled with a cough, coryza, catarrh or vomiting, it is better to remove these disorders before we proceed to the operation,

left

lest the surgeon should be disturbed at the time of performing it, and on account of other inconveniences that might otherwise ensue.

*Of the operation by depression.*

When none of the objections abovementioned exist, the operation by couching or depression may be performed in the following manner. Having placed your patient in a convenient light, and in a chair suitable to the height of that you yourself sit in, let a pillow or two be placed behind his back, in such a manner, that the body bending forward, the head may approach near to you, then inclining the head a little backward upon the breast of your assistant, and covering the other eye so as to prevent its rolling, let the assistant lift up the superior eyelid, and yourself depress a little the inferior one; this done, resting your elbow upon your knee, or (which keeps the hand much steadier) a table of a convenient height, placed on the side of your patient, and your lower fingers upon his cheek, desire him to look stedfastly towards his nostrils, and then strike the needle through the tunica conjunctiva, something less than one tenth of an inch from the cornea, even with the middle of the pupil,



pupil, into the posterior chamber, and gently endeavor to depress the cataract with the flat surface of it. If it should not readily submit, Mr. *Warner* directs the needle to be carefully moved underneath the cataract, and gently raised up, by which means the cataract may be separated from the processus ciliares, and aranea below, and at the same time be disengaged from the inferior portion of the iris, supposing it to be slightly connected with that membrane, which cannot always be foreseen: after the cataract is thus lifted up, the position of the couching needle must be altered, and directed a little above the upper portion of the circle of the pupil, afterwards inclining the instrument downwards and obliquely outwards; at the same time taking great care not to wound the iris, or the processus ciliares, lest a discharge of blood should ensue, sufficiently great to render the aqueous humor opaque, and embarrass the operator. By these means Mr. *Warner* says, the cataract will be so effectually dislodged from the bed of the vitreous humor, and its nutrient vessels be so perfectly destroyed, as to bring on its gradual decay.

If after it is dislodged, it rises again, tho' not with much elasticity, it must again and again

be pushed down. If it is membranous, after the discharge of the fluid, the pellicle must be more broke and depressed: if it is uniformly fluid, or exceedingly elastic, we must not continue to endanger a terrible inflammation by a vain attempt to succeed. If a cataract of the right eye is to be couched, and the surgeon cannot use his left hand so dextrously as his right, he may place himself behind the patient, and use his right-hand.

It is said, that the cataract sometimes passes through the pupil, and gets into the anterior chamber of the eye, in which case the lower part of the cornea is ordered to be divided, and the cataract extracted. Though the necessity of this may be justly called in question, since Mr. *Pott* has proved by repeated experiments, that the lens in that situation, will constantly dissolve.

The cataract is liable to rise again after it has been depressed, but though an unlucky circumstance, yet Mr. *Warner* observes there is this consolation, that the operation may very safely be repeated, and with a good prospect of success, unless some uncommon phænomenon should occur to forbid it. And notwithstanding  
it

it sometimes happens that the cataract cannot be depressed with the needle in the operation ; it must not, he says, be concluded from thence that the operation will certainly be unsuccessful : for it does sometimes turn out contrary to expectation, that the cataract gradually subsides in consequence of the violence done to the capsule of the chrySTALLINE humor and its nutrient vessels, as well as on account of its removal from its bed in the vitreous humor, and the patient is happily restored to sight.

It is not uncommon with travelling operators to present objects to their patients for them to distinguish, immediately after the depression has been attempted, in order to ascertain the success of the operation. But this is carefully avoided by the more skilful and learned of the profession, as any exertion of the diseased and debilitated eye would tend to heighten the consequent inflammation, and might induce a return of the cataract. It is better therefore when the operation is finished, immediately to apply some cooling repellent remedy, and likewise to cover both eyes with a bandage, altho' one only should have been operated upon, lest upon any motion or disturbance of the sound eye, the other should obey its motions. He is

then to be carried into a dark chamber, as the admission of any rays of light would too violently irritate the retina, and there to be laid in his bed, upon his back, supporting his back and head with pillows, so as to preserve them in nearly an erect position. He is to be kept quiet and still, abstaining from the harder foods that require much chawing, as likewise from earnest conversation, laughter, and any thing that might excite coughing or sneezing, inasmuch as these unseasonable motions of the head might occasion a reascension of the cataract. Presently after the operation, the patient should be bled, which should be repeated according to the inflammation and strength of the patient, and glysters should be occasionally administered. A vomiting not unfrequently ensues from this operation, for which, if it continues, an opiate should be given, which will sometimes remove it. During the inflammatory state, warm fomentations should be applied to the eyelids, either with a bit of fine rag or a sponge, and where the restlessness is considerable, anodynes should be given internally.

In this manner, and at the same time, observing a strict regimen as to diet, we are to persist so long as any pain or inflammation remain,



remain. When the inflammation is removed we may admit the light, but it must be in the most gradual manner, letting in but a very small quantity at first, and encreasing it afterwards by degrees, as the patient can bear it. If a weakness and wateriness of the eye should continue, cold spring water with a third part brandy, or aq. sapphirina lowered with common water may be used to advantage.

---

### EXPLANATION OF PLATE I.

This plate contains the human eye and two couching needles, as represented by Mr. *Warner*; also a figure, shewing the manner in which a cataract obstructs the passage of the light, taken from Mr. *Cbeselden's* anatomy.

#### Fig. 1.

A. The couching needle,

#### Fig. 2.

B. The couching needle passed into the eye, with its blade lying on the cataract,

C. The eye.

D. The cornea,

E. The

- E.** The anterior chamber of the eye.  
**F.** The *iris*.  
**G. G.** The posterior chamber of the eye.  
**H. H.** The *processus ciliares*, or posterior *lamina* of the *iris*.  
**I.** The *chrystalline* lens or humor.  
**1.** The *sclerotica*.  
**2.** The external *lamina* of the *choroides*.  
**3.** The internal *lamina* of the *choroides*.  
**4.** The *tunica retina*.  
**5.** The oblique insertion of the *optic nerve*.

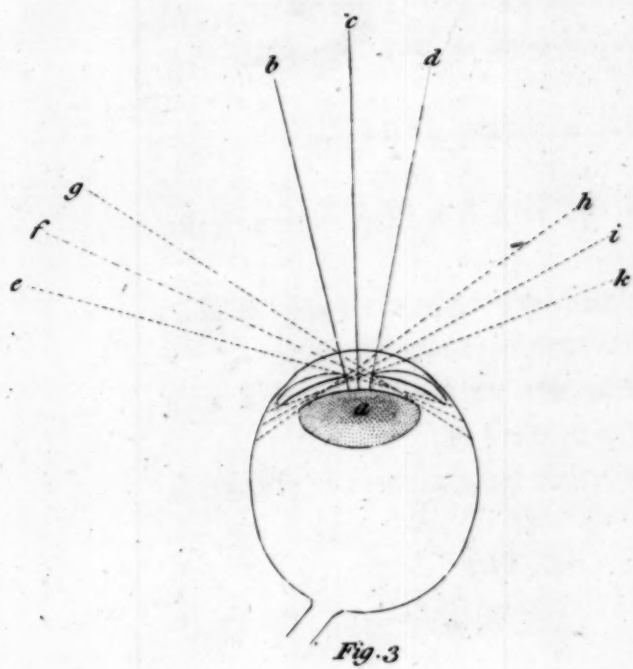
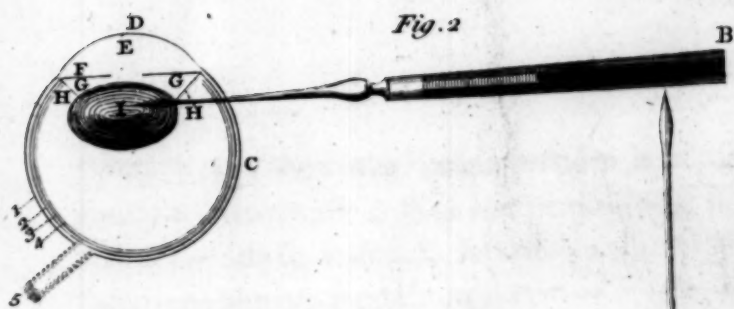
All that space betwixt the internal surface of the *cornea* and the *iris* is called the anterior chamber of the eye.

All that space betwixt the *iris* and the *chrystalline* lens is called the posterior chamber of the eye. Both these spaces are naturally filled with the *aquæus* humor of the eye.

That part of the eye behind the *chrystalline* is filled with the *vitreous* humor, which on its anterior part forms a bed for containing the posterior part or more convex surface of the *chrystalline* lens.

Fig. 3.

Shews how a cataract *a.* will obstruct the light *b. c. d.* which is before it; and how some side light *e. f. g. h. i. k.* may pass to the retina through







through the aqueous humor, but not being brought into a focus, gives only a sense of light without vision.

*The manner of extracting the Cataract, as described by Mr. Warner.*

The manner in which this operation may be performed is as follows. The patient being seated upon a large trunk, or box, the operator places himself exactly opposite, upon a seat of a convenient height, and in a room where the light is moderate, that the pupil may not be too much contracted.

This being done, an assistant stands behind the patient, who puts his right-hand under the patient's chin, after having covered the right-eye, supposing it to be the left, which is to be operated upon: the assistant then places the back part of the patient's head on his breast, at the same time directing the face upwards, to prevent the sudden discharge of the vitreous humor. He afterwards lifts up the superior eyelid with two or more of his fingers, taking care not to press upon the globe of the eye above: the operator at the same time depresses the inferior eyelid, with this precaution, not to press upon

upon the inferior part of the globe of the eye till the incision is made. The patient must look straight forwards, and a little upwards. The operator now fixes his right elbow upon his right knee; after having put his right foot firmly on the patient's seat for this purpose. He then suddenly and resolutely introduces the point of his knife through the external part of the cornea, opposite to the center of the pupil, directing it horizontally betwixt the anterior surface of the iris, and the interior surface of the cornea, into the fore chamber of the eye, till it penetrates through the cornea on its opposite side; when the inferior part of the cornea must be suddenly divided, by directing the blade of the knife downwards, and outwards. The larger and lower the incision is made, the better will the operation be likely to succeed; and if it happens, that the wound thro' the cornea proves too small, it must be enlarged by a pair of sharp scissars, well polished; the blade of which must be curved, so that they may have a convex and concave surface.

The next process of the operation is to wound the aranea. This ought not to be attempted till a few minutes after the cornea has

has been incised: as soon as the incision is made through the cornea, the eyelids should be set loose. By paying a proper attention to these maxims, the whole of the aqueous humor will be evacuated; the iris will become flaccid and subside upon the cataract: the pupil will be dilated, and the instrument for cutting thro' the capsula, may then readily be directed under the flap of the cornea to the inferior edge of the pupil. From these precautions the pupil will escape violence: to which it is very liable from the passage of the cataract through it, when contracted and small. Immediately after the membrane is wounded, the globe of the eye must be pressed gently upwards, that the cataract may be squeezed thro' the pupil and inferior part of the cornea, where the incision has been made. The cataract being thus removed, the eyelids must be covered with a soft double or triple rag, dipped in a cold solution of saccharum saturni, or the pulvis cerussa comp. prepared in damask rose water, or spring water: this application must be kept on with a soft linen roller, and renewed two or three times a day. The patient must be laid on his back upon a bed or couch; and

A a      in

in this situation he must keep himself for some days, that the wound made through the cornea may heal, and the newly secreted aqueous humour may be prevented from escaping out of the eye.

During the inflammatory state, the eye should be treated with emollient fomentations and the patient's body must be kept open; opiates likewise must occasionally be administered.

### EXPLANATION OF PLATE II.

This plate contains the instruments employed by Mr. *Warner* in the extraction of the cataract; as also the knife used by Mr. *Sharp* for the same purpose.

Fig. 1. The eye with Mr. *Warner's* knife passed thro' the cornea.

Fig. 3. The eye with the wound on the inferior part of the cornea, with the instrument passed under the cornea, and lying upon the iris, for dividing the aranea.

Fig. 4. The cataract.

Fig.



Fig. 1.

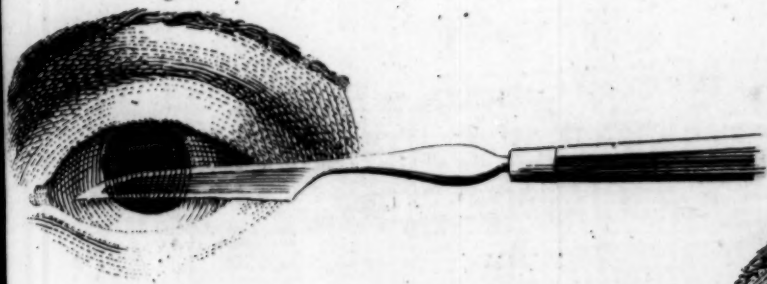


Fig. 2.

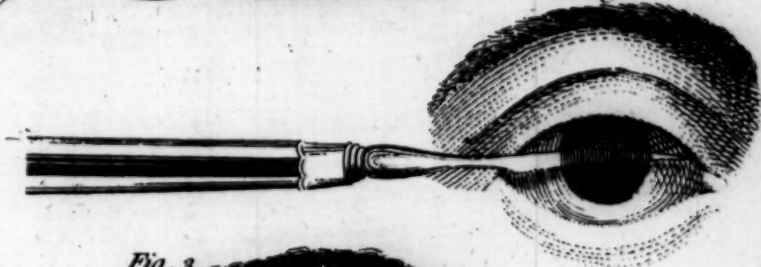


Fig. 3.

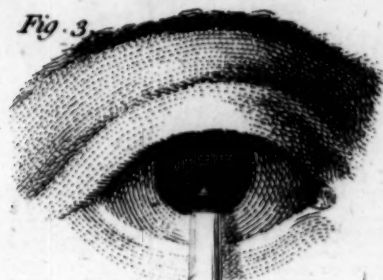


Fig. 4.



Fig. 6.

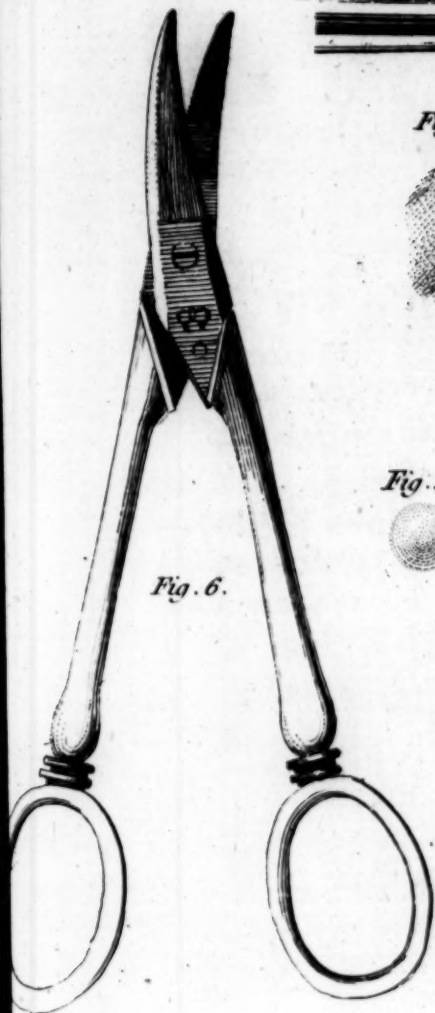


Fig. 5.





Fig. 5. The instrument for dividing the aranea with the point of the lancet out of its case.

Fig. 6. The curved scissars for enlarging the wound of the cornea.

---

C H A P. XXIV:

*A Gutta Serena.*

**T**HIS is a disease the chief symptom of which, is a suppression of sight, accompanied with an immoveableness of the pupil, without any sensible opacity of the eyes.

The principle of a gutta serena is either in the brain, at the thalamus nervorum opti-  
corum, or in the passage of these nerves, or in the whole of the retina, occasioning a total insensibility of the eye to the rays of light.

If the sound eye be shut, and the blind one presented to the light, the pupil is not only not constricted, but is sometimes dilated, and this is the only motion which remains, and indicates a perfect gutta serena.

A a 2

Though

Though in most species of the gutta serena, the pupil is open, nay dilated and immoveable, yet sometimes this disease is accompanied with a myosis or permanent and preternatural constriction of the pupil.

When a gutta serena accompanies or follows apoplexy or palsy, it indicates the use of cathartics, emetics, blisters, setons, and issues in the neck. As a topical application, the vapor of spirit of wine received by the eyes, has been much recommended; but of this class, by far the most powerful and certain is the electric fluid, conveyed in a proper manner to the eye.

Sometimes this disease proceeds from pregnancy, acute fevers, suppression of the menses, or piles, or a plethora from what cause soever, and then it is accompanied with the symptoms of a plethora. The patient complains of a violent and deep seated pain of the head, or a painful weight in the bottom of the eye. Several have been cured by opening the frontal vein, and permitting the blood to flow, until it stopped of its own accord: it has availed not unfrequently to open the jugular vein. Bleeding from the foot



foot and medicines exciting the menses, are praised by St. Yves, who directs viper broths, millepedes and opthalmic waters to be afterwards used,

Infants are also sometimes born blind, which however is only known as they grow older. It is singular in this species, that the pupil although immoveable, is not more open, than it is at that age, in those who see perfectly.

A gutta serena happens sometimes from a synchysis, which is a confusion or mixture of the dissolved vitreous with the aqueous humor. This begins with internal, severe, and very obstinate pains of the eye, accompanied with head ach, or hemicrania, watching, fever and sometimes a preternatural distension or fulness of the globe: the sight is also darkened. These pains sometimes continue for several months, nay whole years, when at length the sight is entirely abolished. This species of gutta serena is incurable.

But it often happens that some time after the sight of one eye has been lost in this manner,

manner, the other eye becomes inflamed, and affected with similar symptoms, and is in imminent danger of the like misfortune, which St. Yves presumes might be avoided, by extirpating the blind eye. This extirpation of the eye, or excision of the cornea with the efflux of the vitreous and chrystalline humors, is by no means free from danger, and an incurable hemicrania, and even madness have been known to ensue from it.

There is another species arising from eruptive diseases either repelled or retained. Among these may be placed that gutta serena, which depends upon an acrimony of the humors, in which therefore gentle laxatives, bathings, acidulated waters, diluent, sudorific and diuretic ptizans are praised. St. Yves mentions a gutta serena arising from a suppressed herpes of the face, which was removed on restoring the herpes, by opening and sudorific drinks, ptizans, &c.

This disease has also been produced by wounds, concussions of the eye and head, tumors situated upon and compressing any part of the optic nerve, as also by the epilepsy, convulsions, lues venerea, too free use  
of

of narcotics, sudden access of a strong light and temporarily by intermittent fevers, and the hysteria.

### C H A P. XXV.

#### *Dropsey of the Eye.*

**T**HIS disease is owing to an encrease, sometimes of the aqueous, sometimes of the vitreous humor, and sometimes to both.

The signs of a preternatural accumulation of the aqueous humor are; a successive encrease of the bulb of the eye, with a turgid tension and protusion of it from the orbit, so that the eyelids cannot at all, or with difficulty cover it; the cornea is preternaturally elevated and prominent; the iris deeper, and more remote from the internal superficies of the cornea; the pupil immoveable, in some cases dilated, in others contracted: (the moveableness and magnitude of the pupil remain unaltered according to *M. Jan.*) The sight which was faultless at the beginning, becomes



comes successively weaker, and more obscure; at first a mild blunt pain is felt about the bottom of the eye, which afterwards becomes more violent; this is accompanied with a hemicrania of the same affected side, a stupor of the parts of the face, and sometimes an emphysema, tooth-ach, and sleeplessness. At last, when the bulk of the eye is still farther encreased, an epiphora and ectropium supervene.

This complaint is caused by an obstruction in the absorbent vessels, which may be the consequence of long inflammations, especially of the cornea, violent blows, or the application of too detergent or drying collyria.

The signs of a ferous turgescence of the vitreous humor are; a pain in the forehead, and one or both eyes; the pain being removed, or abating, the globe of the eye appears somewhat larger, and more eminent; the chryselline is forced forwards; the pupil is unusually dilated, and contracts but very little, and with great difficulty when exposed to a strong light; the sight is so obscured, that the patients can hardly distinguish objects,



jects, or the light, and cannot therefore safely walk by themselves. In general these accidents attack both eyes, either at the same time, or a little while afterwards.

The prominence of the eye is less perceptible when the iris is black, and when both eyes are equally affected; but in those who have blue, white, or grey eyes, and well opened, and when only one eye is affected, it is more easily observed. With proper assistance the greater part of those afflicted with this complaint, recover their sight, though not in so perfect a manner as before.

Persons of a melancholic and atrabilarious temperament, are sometimes afflicted with this disease of the vitreous humor: but those who are the most liable to it, are, women after the first or second month of their pregnancy, in whom it continues till they are delivered, and virgins with obstructed menses, whom it afflicts for four or five months. It also sometimes happens to men after a suppression of the hæmorrhoids;

This disease at first is difficultly distinguished from an incipient common cataract: but  
B b
after-

afterwards when no opacity of the chrystalline comes on, and the sight is in some measure restored, it may be distinguished from other diseases.

St. Yves denies that this complaint proceeds from a preternatural enlargement of the vitreous humor, and likewise says, he could never find the globe of the eye bigger, or any way different from its natural state. He ranks it as a species of gutta serena, and thinks it is produced by a deposition of some humor upon the optic nerves, which by compressing them, brings on this disease.

The diagnosis of a preternatural accumulation of the aqueous humor, combined with an encrease of the vitreous, is more difficult, though it is not of any great consequence as to the cure. However it may be guessed at, from the too great bulk of the globe of the eye, increasing rapidly, and it's remarkable hardness; from the squinting; great dilatation of the pupil; deep situation of the iris, and great projection of the cornea. It is owing sometimes to a sharper, sometimes to a milder serum pouring down upon the eye:

in the first case, besides the symptoms just related, it is accompanied with an internal and external inflammation, fever, and sleeplessness, which are wanting in the latter case.

The cure of a droply of the eye consists of, bleedings in the arm, neck, foot, or even from the temporal artery, as the violence of the pain, and the degree of plethora require; blisters applied to the neck, or behind the ears; an issue made in the back part of the head, and kept open for several months; purges, and mercurial hydragogues; diaphoretics and resolvent fomentations.

If these remedies should prove ineffectual, and the disease should originate from an excessive quantity of the aqueous humor, a puncture must be made, with a lancet or very small trocar, behind the iris, in the place where the couching needle is introduced, into the anterior chamber, and the humor evacuated; after which a compress dipped in some cooling collyrium is to be first applied, and over that a piece of sheet lead, and a bandage, in order, if possible, to moderate the redistension of the eye. When



the water accumulates again, and the eye returns to its former magnitude, the operation must be performed again, and repeated, until the eye remains of its natural size. *Nuck* relates an instance where he was obliged to make the puncture five times, and at last succeeded, the eye remaining of its proper magnitude.

But if the natural figure and sight of the eye are entirely destroyed, and the pain, and other bad symptoms encrease, the only resource we have left, is to incise the cornea and discharge all the humors; and if, notwithstanding this, the eye shall yet remain so big, that the eyelids cannot conveniently close over it, a portion of it must be taken off, in the same manner as was directed in the staphyloma, after which the wound is to be healed, and an artificial eye may be inserted.

## CHAP.



## C H A P. XXVI.

*Abscess of the Eye.*

THE preceding disease terminates in this; if the inflammation brought on by a shar- per serum inundating the eye, goes into sup- puration. After terrible pains, inflammation encreased both within and without, great tumefaction of the membranes forming the white of the eye, eversion of the eyelids, hot and sharp tears, the eye at last becomes troubled, and there happens a suppuration and destruction of the internal parts. After some time, the cornea transparens ulcerates, and breaks, and the matter flows out: this is followed by a diminution of the pains, suc- cessive cleansing of the parts, lessening of the globe of the eye, and at last a cicatrix.

The method of cure during the inflamma- tory state, has been already described in the foregoing chapter. The treatment, when the inflammation has terminated in suppuration, is as follows. As soon as ever matter is known to be formed, or even before it is thoroughly formed, if the inflammation should be

be very great, and the pains excessive, the cornea is to be opened with the point of a lancet, in that part where the matter points; or, if the matter seems to affect no part particularly, in some depending part: the matter being then evacuated, and the eye cleansed by abstergent collyria, a cicatrix is at last induced. By this means we prevent the greater pains arising by the procrastination of the bursting when left to itself.

---

## C H A P. XXVII.

### *Cancer of the Eye.*

**A** Thick blood stuffs up the vessels of the membranes of the eye, and renders them very thick, and, as it were, fleshy: the inflammation and pain at the beginning is moderate, but they gradually encrease as the disease advances; sight is destroyed.

A disease of this sort is terrible indeed; it is, a cancer of the membranes of the eye;

eye; which, although sometimes it is not ulcerated, yet nevertheless occasions dreadful pains, accompanied with a fever, and at last death. Neither health nor life can be preserved but by the extirpation of the eye alone \*.

\* A very remarkable case of a cancer of the eye, attended with some extraordinary circumstances, is related by Mr. *Hayes* in the third volume of the *Medical Observations and Enquiries*, p. 120. A very terrible case of this sort is also to be met with in *Fab. ricius Hildanus, Centur. x. Observ. 1.*

F I N I S.